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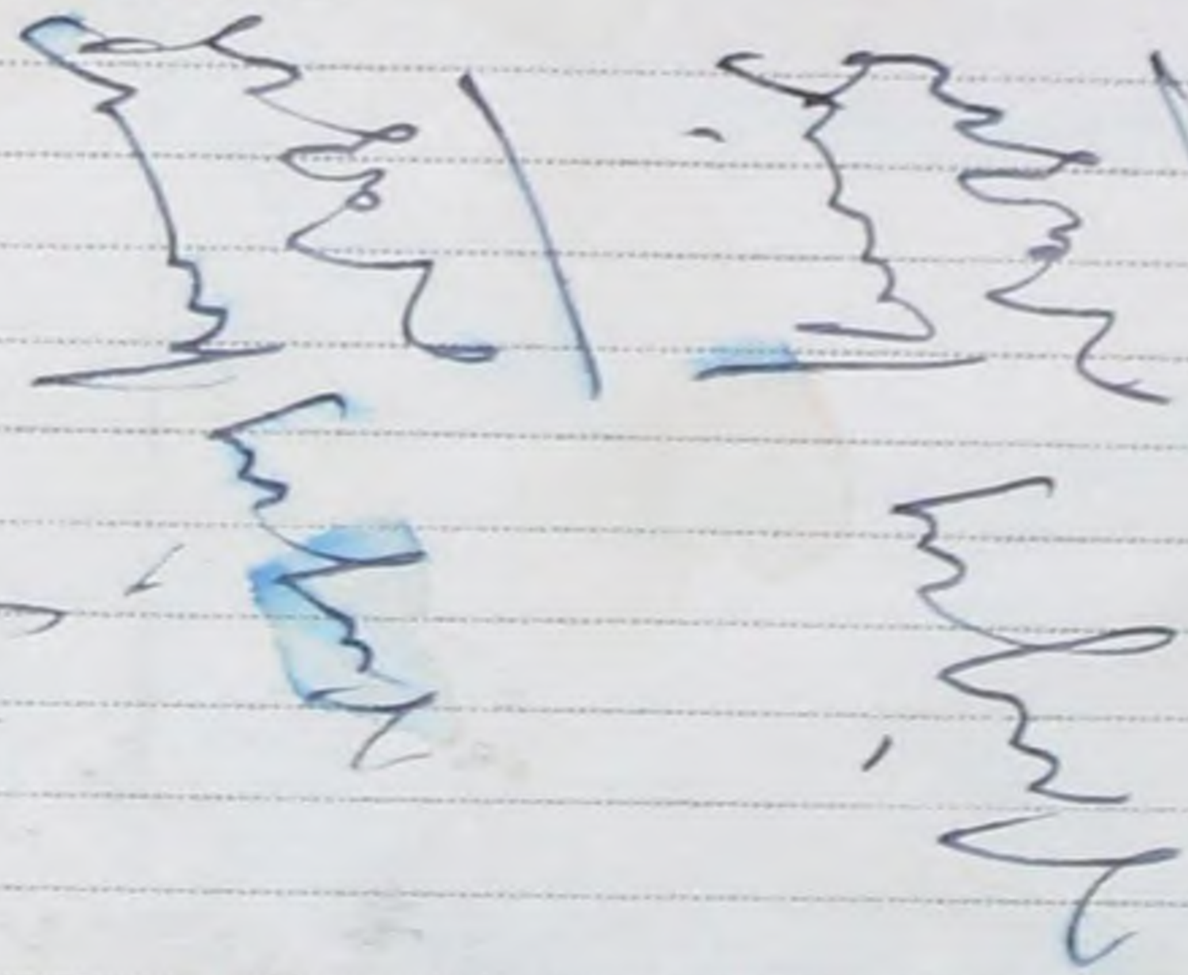

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ITS GEOGRAPHY, ITS RESOURCES AND ITS PEOPLE

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CEYLON

ITS GEOGRAPHY, ITS RESOURCES AND ITS PEOPLE

BY

ELSIE K. COOK, F.R.G.S.

GEOG. DIP., LOND. UNIV.

A new edition of "A Geography of Ceylon"
revised and brought up to date by

K. KULARATNAM, M.A.(LOND.), R.G.A., F.R.G.S.

INSTITUT DE GÉOGRAPHIE, UNIVERSITÉ DE PARIS

Maps and Diagrams drawn by

MAURICE WEIGHTMAN, A.R.C.A.

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PREFACE TO THE FIRST EDITION

THIS book owes its existence to the year's visit (1924-5) which I paid, in an advisory capacity, to the Buddhist English Schools and the two Buddhist training schools for teachers in Ceylon. My visit was due to the initiative of Mr. P. de S. Kularatne, Principal of Ananda College, to whom I am indebted for much information as well as for the many facilities I enjoyed for travelling about the island and making the acquaintance of almost every section of the population. The cordial hospitality which I received everywhere in Ceylon made my stay there more than pleasant, and I should like to take this opportunity of formally thanking those who gave me such kindly assistance, though it is obviously impossible for me to give a full list of their names. I am specially indebted to Rata Mahatmaya Bibile and his wife; Mr. Kanangara and members of the Jaffna Students' Congress; Mr. M. E. Fernando and Mr. D. W. Dharmabunda, who accompanied me on a long trip in the more remote districts of Ceylon. I remember with gratitude the courtesy which the Chief Inspector of Police showed me at Kataragama, and the friendliness and generosity with which I was allowed to see all that I wished at the exhibition of the Tooth Relic at Kandy and in many Buddhist temples. The masters and boys of many of the schools accompanied me on numerous walks and fatiguing hill-climbing expeditions. I had also the privilege of staying in some of the most delightful homes.

For much valuable assistance in the preparation of my Geography my cordial thanks are due to Dr. Pearson, Government Marine Biologist, for helpful suggestions with regard to Seas and Fisheries; to Mr. Bamford, of Colombo Observatory, for information concerning Climate; to Dr. Dudley Stamp, of the London School of Economics, for certain particulars relating to Geology; and to the Hon. Mr. W. A. de Silva, Mr. and Mrs. Kularatne, Mr. A. Ginigé, and Dr. Amirthalingam for many details relating to social life and customs. I am also grateful to Mr. A. Ginigé, M.A., for translating the terms used on the maps, for lending his own map of paddy lands for publication, and for going over the manuscript of the whole book. Mr. F. G. Ives, M.A., of Isleworth

County School, has given considerable help with the English text, and proof-reading.

Certain portions of the work have presented special difficulties to the author, but I hope that no section of the community in Ceylon will take exception to my treatment of the more controversial points in the chapters on Historical Geography, Races, and Civilisation.

Most of the maps, apart from those of which I have been allowed to use the originals, are reproduced by courtesy of the Surveyor-General from Survey publications or Government Reports. The Sinhalese lettering has been inserted in this edition in order that the maps may be available for a future Sinhalese version of the book, which I hope it will be possible to issue.

Any criticisms or suggestions for the improvement of the work will be welcomed by the author.

ELSIE K. COOK.

August, 1930.

PREFACE TO THE SECOND EDITION

SINCE the publication of the first edition of this work in 1931, there have, of course, been many changes in the industrial life of the country villages of Ceylon.

In preparing a second edition for the press it has therefore been found desirable to bring the book up to date in this respect. This task has been admirably performed by Mr. K. Kularatnam, M.A., Institut de Géographie, Université de Paris, who was well acquainted with the author, and who has been interested in the work from the earliest days.

In the author's introduction the book is assumed to be primarily a textbook for the use of secondary schools. This was the original design, but as the work developed so the scope broadened, and it may be recommended with confidence to anyone whose interest in that part of the world has been aroused by the recent political changes, not merely as a mine of factual information about the geographical aspect of Ceylon, but as a real help to the understanding of the life and psychology of its people.

EVA D. COOK.

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MAP

Political Map of Ceylon - - - - - - *Frontispiece*
(Reproduced from the Handbook to India, Burma and Ceylon by permission of Messrs. John Murray.)

INTRODUCTION

This book is intended for the use of teachers and scholars in secondary schools, to whom no scientific study of the geography of Ceylon has yet been available. For some time past, teachers have been urged to make the geography of the home country the basis of their teaching ; for once the methods of modern geography have been grasped by means of a thorough study of a familiar region, it is easy to proceed to the study of any other part of the world. The necessary information or training, however, has not always been available to the teachers concerned, and the author's aim has been to supply this deficiency as regards Ceylon. The following suggestions to teachers with reference to the use of this book and the teaching of geography in general are offered in the hope that they may be of use to those who are devoting their efforts to the improvement of education in the island.

First, with regard to the book itself.

1. It contains a good deal more than is required for the average pupil in a secondary school, and the teacher should exercise discretion as to the parts selected for study. None of the questions dealt with are beyond the understanding of the ordinary pupil between fifteen and eighteen, but some parts may be greatly simplified by the teacher.

2. The study of the book is of little value unless it is supplemented by practical study in the field. The statements in the text should be verified by actual observation, wherever possible, and should be corrected if they are found inaccurate. Consult the detailed Survey Maps if possible.

3. Do not allow mere memory repetition and aimless copying of maps. Make your pupils apply their intelligence, and regard the memorising of facts as supplementary to the use of reason and observation. Never work without a map.

4. Impress on your pupils the wider aim of their study—to learn the resources of their country and how to develop them, to know and appreciate its beauties. They should learn to compare their country with others and consider in what directions progress might be made.

5. Do not be afraid to say "I don't know." Set your pupils the example of being willing to learn, and let them see how simple it is to fill the gaps in one's knowledge when one realises where they are. In imitating you they will learn the intelligent use of their school-books and other works of reference.

Secondly, as regards the teaching of geography in general.

1. Do not make it too theoretical. Give practical exercises wherever possible. Try not to be too "bookish."

2. Use wall maps whenever possible, and try to get good relief maps of the continents.

3. Never allow mechanical copying of complicated maps, especially by younger pupils. The map of the whole world should only be attempted by pupils of upwards of fourteen years. Do not allow the tracing of maps unless the outline is too difficult for the age when it is required.

4. Maps should be regarded as the shorthand of geography. Pupils should be taught to illustrate their work by rough sketch maps of a diagrammatic nature showing one or two definite points on each.

5. Map books done for show and not for actual use are of little service. Remember that you are not training draughtsmen, but trying to make your pupils think about the world. Maps and written work should go together in the same book, and the pupils should be encouraged to make rough copies of any sketch maps or diagrams you do on the blackboard direct into their ordinary exercise books. Similarly, they should be trained very early to take down notes during the lesson.

6. Remember that general principles are more important than small details. For instance, it is more important that your pupils should be taught to study the characteristics of other nations from a broad standpoint, than that they should be able to repeat all the stations from Colombo to Galle. Try, however, to select a minimum number of important names which the average pupil should know.

7. Try to collect pictures of the countries studied. There are many ways of securing these from the different modern magazines and illustrated papers. Pictures often speak more strongly than language to both children and adults, and though the titles may be written in English it is quite easy to get them translated into Sinhalese or Tamil. Among the best sources of pictures are the *Geographical Magazine*, 91 St. Martin's Lane, London, W.C.2, and the *National Geographic Magazine*, obtainable from the Office of the National Geographic Society, Washington, D.C., U.S.A.

8. Try to get a special geography room in the school—one which can be locked up at night. Then you can collect things to illustrate your lessons and make them interesting. When there is a special room the pupils will begin to think that the subject is important, and they can be trained to look after the things you use—a very valuable lesson in public service.

9. Put wall maps and reference books out in the sun regularly. If constantly dried, they will last much longer. If you have not a servant to do this get your pupils interested in looking after the things.

10. Read all you can about other countries to give your mind a little background ; but do not be discouraged if you cannot get the requisite books. Work hard to obtain a school reference library.

11. Try to keep your knowledge up-to-date. A great deal of information about Ceylon is published every year in Government Reports, which can be obtained from the Government printing office quite cheaply. A large amount of the information in this book has been obtained from these reports. The *Ceylon Year Book*, compiled by the Government Director of Statistics, contains the most useful summary. The *Children's Newspaper*, published every week in Britain, gives a very useful summary of events of geographical interest.

Conventional representation of the Sinhalese lion, the symbol of the race.

PART I

HISTORICAL GEOGRAPHY

PART I. CHAPTER 1

"LANKA" OR "CEYLON" IN FOREIGN WORKS OF TRAVEL

"The best island of its size in the world."—*Marco Polo*
[Italian of thirteenth century].

THE most significant fact relating to the historical geography of the island called by foreigners "Ceylon," is that it has never been known to the outside world by the name used by the chief inhabitants, the Sinhalese, in their own language.[1] It has, throughout the ages, been used by people of all nations as a stepping-stone across the great Indian Ocean, but very few of its countless visitors have spent any length of time in the country. In olden days navigation was a dangerous business, and it was regarded as an act of merciful providence that this fertile island, inhabited by reasonably amiable people, who allowed voyagers to land, refresh themselves, or do trade, had been placed mid-way across the mighty Indian Ocean. In the frail sailing vessels used by early navigators, voyages were long and fraught with every kind of danger. Fa-hsien, the great Chinese traveller of the late fourth century, was usually restrained in his utterances, yet he said of his journey from Ceylon to Sumatra:

"The gale blew on for thirteen days and nights. . . . This sea is infested with pirates, to meet whom is death. The expanse of ocean is boundless; east and west are not distinguishable; only by observation of the sun, moon and constellations, is progress to be made. In cloudy and rainy weather our vessel drifted at the mercy of the wind, without keeping any definite course. In the

[1] The writer, therefore, needs to make no apology for using the name "Ceylon" instead of "Lanka" in this book, although it is intended for Ceylonese students.

darkness of night nothing was to be seen but the great waves beating upon one another and flashing forth light like fire ; huge turtles, sea-lizards and such-like monsters of the deep." (Trans. by H. A. Giles.)

Fa-hsien is considered to be a fairly accurate recorder, though at this period all travellers were prone to exaggeration. From his account we may conclude that in those days the journey from Ceylon to Sumatra was hardly a pleasant experience. To-day travellers are happy and secure in their large "floating hotels," yet they are glad to sight the palm-fringed shores of what has so often been called the "earthly paradise," after five or six days of open sea from Aden or Penang.

Probably no island in the world has been more frequently mentioned in the records of travellers. The modern passenger who spends the day in port while his vessel is coaling and takes his rickshaw ride round what foreigners are pleased to call the "native quarter, or Pettah" in Colombo, goes by car to Mt. Lavinia, or is ambitious enough to venture as far as Kandy to see the Tooth Temple, is imitating a long series of predecessors. Thousands of people land on the island every year and write the same remarks about its beauties and the curious scenes that they have witnessed—often, we must add, as greatly garnished by imagination as those of more ancient days ! The rest of the island remains to the world at large more or less of a mystery. Very few foreigners have studied it thoroughly, and still fewer have taken the trouble to master its language ; on the whole the Ceylonese have been far more ready to learn other languages and have thus accommodated the many strangers with whom it has been their lot to come in contact. It is not, therefore, surprising that Lanka, the vernacular name of the island, has always remained a mystery to the outside world, and that it has been given a number of other names by the different people who stepped, in passing, on its friendly shores.

The long series of descriptions of Ceylon in the records of travellers, dating back to the earliest times, are of such uncommon interest that no treatise on its historical geography would be complete without reference to them. The perusal of the following extracts will doubtless amuse the reader, especially if he be an inhabitant of Ceylon. In them we see the personality of the authors—how each man looks with different eyes upon the same land—the usual tendency to exaggeration to which voyagers of all races and all ages are prone, and also not a little of an irresistible temptation on the part of the inhabitants to nourish their sense of humour at the expense of credulous strangers in search of "marvellous things and strange antiquities." Amidst all this, however, there is a

basis of truth which gives us glimpses of the island as it appears at different stages of its history.

I. By Solinus Polyhistor, a Roman of the first century A.D. This picturesque translation was made by an Englishman, Arthur Golding, from the Latin and

FIG. 1.

The palm-fringed shores of Ceylon, near Matara. Men on poles watching fish in the bay.

printed in 1587. As it is written in sixteenth century English the spelling has been partly modernised for the benefit of Ceylonese readers.

" Until such time as the rashness of man searching in the sea throughly found the truth of the matter, men thought a great while that the Isle of Taprobane had been another world, and the very same which the Antichones were believed to inhabit. But the valiantness of the Great Alexander suffered not the ignorance of the common error to continue any longer : but he spread the renown of his name even to the unknown places. For Onesicritus, Admiral of

the Fleet of Macedonia, searching out this land, brought unto our knowledge how big it is, what it breedeth and in what case it stood. It extendeth seven thousand furlongs in length and five thousand in breadth. It is divided into two parts with a river. For part thereof is replenished with beasts and elephants, greater than Inde beareth, and the rest is possessed by men. . . . It is situate between the East and the West. It beginneth at the Eastern Sea and lyeth full beyond Inde. From the Parsians, a nation of Inde, it hath been twenty days sailing thither. But, for as much as they went in boats of reed and ships of nyle, it is now abridged to seven days sailing in one of our ships. Between them and the Inde lies a shallow sea not above six fathom deep, and yet in certain channels of such an exceeding depth that there was never anchor yet that could come to the bottom thereof. There is no heed to be taken of the stars in sailing there. For neither is Charles' Wain (The Plough) seen there, neither do the seven stars called Vergiliæ (the Pleiades) at any time appear there. They see the moon above the earth, only from the eighth day to the sixteenth. There shineth Canopus, a bright star and of very great largeness. They have the sun rising on their right side and the sun setting on their left. Wherefore as there is nothing for men to observe whereby they may sail to arrive at the appointed place : birds lead them whose flight in making to the landward they use as a lodestar to direct their course. . . . .

" They (*i.e.* the people of the island), hew out marble that is chequered and gather great store of mother pearls, and those of great sort. They be shellfishes in whom this kind of stones is sought, which at a certain time of the year do thirst after the dew, for desire whereof they gape, and when the moon sheddeth most abundance of moisture they draw the desired humour by a certain sucking . . . and according to the quality of the thing they have glutted in, such is the disposition of the pearls that they breed. . . .

" And the shellfishes themselves have a kind of understanding . . . insomuch as when the day is at the hottest, because their stones should not be dimmed with the heat, they duck under the water and dive into the deeps to save them from the heat. The shellfishes are afraid to be laid for by the fishers : and thereon it comes to pass that they hide themselves for the most part, either among the rocks or else among the dogfishes. They swim in schools. Some one is captain of the whole school. If he be taken, even those that escaped return into the net again."

II. By Fa-hsien, a Chinese scholar, late fourth and early fifth centuries. [Translated by Legge.]

"The kingdom is on a large island, extending from east to west fifty yojanas [=distance travelled by bullocks in one day], and from north to south thirty. Left and right from it there are as many as 100 small islands, distant from one another, ten, twenty, or even 200 le ; but all subject to the large island. Most of them produce pearls and precious stones of various kinds ; there is one which produces the pure and brilliant pearl—an island which would form a square of about ten le. The king employs men to watch and protect it, and requires three out of every ten such pearls, which the collectors find.

"The country originally had no human inhabitants, but was occupied only by spirits and nagas, with which merchants of various countries carried on a trade. When the trafficking was taking place, the spirits did not show themselves. They simply set forth their precious commodities, with labels of the price attached to them ; while the merchants made their purchases according to the price ; and took the things away.

"Through the coming and going of the merchants in this way, when they went away, the people of their various countries heard how pleasant the land was, and flocked to it in numbers till it became a great nation. The climate is temperate and attractive, without any difference of summer and winter. The vegetation is always luxuriant. Cultivation proceeds whenever men think fit : there are no fixed seasons for it."

He describes the footprint of Buddha, Abhayagiri Monastery with the jade image of Buddha and the sacred Bo Tree [which had already been propped up with a post and had pierced a shoot through it], the Vihara under the Bo Tree, the Vihara of Buddha's Tooth, and the ceremony of bringing it forth at the end of the third month. He went to Mihintale, visited Dharma-Gupta, and witnessed the burial of a Sramana (a man who had attained enlightenment).

"The king practises Brahmanical purification, and the sincerity of the faith and reverence of the population inside the city are also great. Since the establishment of government in the kingdom there has been no famine or scarcity, no revolution or disorder. . . .

"In the city are many Vaisya elders and Sabæan merchants, whose houses are stately and beautiful. The lanes and passages are kept in good order. At the heads of the four principal streets there have been built preaching halls, where, on the eighth, fourteenth and fifteenth days of the month, they spread carpets, and set forth a pulpit, while the monks and commonalty from all quarters come together, to hear the Law. The people say that in the kingdom there may be altogether sixty thousand monks, who get their food from their

common stores. The king, besides, prepares elsewhere in the city a common supply of food for five or six thousand more."

III. By Cosmas Indicopleustes, a Greek, writing in the sixth century, A.D., probably giving the information of Sopatrus, a Greek merchant. (Translated by Helen Briggs.)

" This is a great island of the ocean, situated in the Indian sea ; which is called by the Indians Sielediva, but by the Greeks Taprobane, where the jacinth stone is found ; and it lies beyond the land of pepper. About it lie many small islands close to one another, in all of which sweet water and coconuts are found. . . . From the whole of India and Persia and Ethiopia [=the modern Abyssinia], many ships come to the island on account of its central position, and many, too, are sent out from there. . . . So this island of Sielediva, situated, as it were, in the centre of the Indies, and producing the jacinth, receives merchandise from all the emporia and exchanges with all and constitutes in itself a great emporium [=trade centre]. . . . The King of Sielediva buys both elephants and horses. The elephants are measured by the cubit and the price paid in proportion to their height. . . . The horses he buys are brought to him from Persia and the importers are exempt from taxation."

IV. By an Arab writer of the ninth century whose name is not known. (Translated from J. T. Reinaud's French version of the Arabic.)

" Beyond these islands, in the sea of Harkand is Sarandib, the chief of all these islands which are called Dobijat. It is all encompassed by the sea, and on certain parts of its coast they fish for pearl. Up in the country there is a mountain called ' Rahun,' to the top of which it is thought ' Adam ' ascended, and there left the mark of his foot in a Rock, on the top of this same mountain. There is but one print of a man's foot, which is seventy cubits in length ; and they say that ' Adam ' at the same time stood with his other foot in the sea. About this mountain are mines of the Ruby, Opal and Amethyst. This island, which is of great extent has two kings ; and here you may have Wood-Aloes, Gold, Precious Stones and Pearls, which are fished on the coast ; as also large shells of a kind, which they use instead of Trumpets, and which they much value.

" When a king dies in the island of Sarandib, they lay his Body on a car, in such a manner that his Head hangs backwards till it almost touches the ground, and his Hair is upon the earth ; and this car is followed by a woman with a Broom in her Hand, therewith to sweep dust on the face of the deceased, while she cries out with a loud voice : ' O men, behold your king who was yesterday

your master ; but now the Empire he exercised over you is vanished and gone. He is reduced to the state you behold, having left the world ; and the Arbiter of Death hath withdrawn his soul. Reckon therefore no more upon the uncertain hopes of life.' This cry and some others like it, they continue for three days, after which the dead body of the king is embalmed with Sandalwood, Camphire and Saffron, and is then burnt, and the ashes are scattered abroad to the Wind. It is a universal custom all over the Indies to burn the bodies of the dead. The island of Sarandib is the last of the islands of the Indies. When they burn a king it is usual for his wives to jump into the fire, and to burn with him ; but this they are not constrained to do if they are not willing."

V. By Abu Zeid al Hasan of Siraf, ninth century (also from J. T. Reinaud's version of the Arabic).

" In the mountain of Sarandib they find precious stones of various colours, red, green, and yellow, most of which are, at certain times, forced out of caverns and other recesses by waters and torrents. In these places the king has his officers to keep an eye over those who pick them up. Many times also they are dug out of mines, just like metals, and they sometimes find precious stones in the ore, which must be broken to get at them.

" The king of this island has laws which are the groundwork of the Religion and Government of the country. Here are doctors and assemblies of learned men like those of the Hadithes among the Arabs. The Indians repair to these Assemblies and write down what they hear of the lives of their prophets and the various expositions of their laws. Here is a very great idol of the finest gold ; but concerning the weight thereof navigators are not agreed. Here also are Temples where great sums of money are expended.

" In this same island there is a very great multitude of Jews, as well as of many other sects, even Tanwis or Manichees, the king permitting the free exercise of every Religion. At the end of this Island are valleys of great length and breadth which extend quite to the sea. Here travellers stay two months and more in that called Gab Sarandib, allured by the beauty of the country, bedecked with trees and verdure, water and meads, and blessed with a wholesome air. This valley opens upon the sea called Harkand, and is transcendently pleasant. You there buy a sheep for half a dram, and for the same you purchase as much of their drink as may suffice many persons. This drink is made of palm-honey, boiled, and prepared with the Tari (Taddi) or juice which runs from the tree.

" Gaming is the most usual occupation of the inhabitants here. They play

at draughts, and their other principal pastime is fighting of cocks, which are very large in this country and better provided with spurs than cocks commonly are ; and besides this the Indians arm them with blades of iron in the fashion of cangiars. Upon these combats they bet gold, silver, lands, farms and many other things, which are won by the master of the cock that beats. They play also at draughts, and venture great sums upon the chance of this game, but with such fury that those who have not wherewithal, debauchees and desperate people, often play away the ends of their fingers. While they are at play they have a fire by them and thereon a pot of Walnut or Sesame Oil ; they have no Oil of Olives ; and they place a little, but very sharp, hatchet between them. When one of them has won a game the other lays his hand upon a stone, and the winner cuts off the end of the loser's finger with the hatchet ; and the patient dips his injured part into the boiling oil, to cauterize the wound. And yet they cannot shake off this evil habit of gaming ; on the contrary, they sometimes persist in it so obstinately and so long, that, before they part, they have all their fingers thus mutilated."

VI. By Chua-Ju-Kua, an Inspector of Foreign Trade in Fukien, China—about the end of the tenth century. (Translated from the Chinese by Rockhill & Hirth.)

" Sailing from Lan-wu-li, one knows that one is nearing Si-lan by continual flashing of lightning.

The king of Si-lan is black, his hair unkempt and his head uncovered. He wears no clothes but has a cotton cloth of different colours wrapped around him ; on his feet he wears sandals of red leather, tied with golden strings. When he goes forth he rides an elephant or is carried in a litter. All day he chews a paste of betel nut and pearl ashes.

" His palace is ornamented with cat's eyes, blue and red precious stones, cornelians and other jewels ; the very floor he walks upon is so ornamented. There is an eastern and a western palace, and at each there is a golden tree, the trunks and branches all of gold ; the flowers, fruit and leaves of cat's eyes, blue and red precious stones and such like jewels. At the foot of these trees are golden thrones with opaque glass screens. When the king holds his court he uses the eastern palace in the forenoon and the western in the afternoon. When the king is seated, the jewels flashing in the sunshine, the glass screens and the jewel tree shining on each other, make it like the glory of the rising sun.

" Two attendants are always present holding a golden dish to receive the

remains of the betel nut paste chewed by the king. The king's attendants pay a monthly fee of one 'i' of gold into the government treasury for the privilege of getting the betel nut paste remains, for it contains 'plum-flower,' camphor and all kinds of precious substances.

"The king holds in his hand a jewel five inches in diameter, which cannot be burnt by fire, and which shines in the darkness of night like a torch. The king rubs his face with it daily, and though he were past ninety he would retain his youthful looks. The people of the country are very dark-skinned, they wrap a sarong round their bodies, go bare-headed and bare-footed. They use their hands in taking up their food; their household utensils are of copper.

"There is in this country of Si-lan a mountain called Si-lun-tie, on top of which there is a huge imprint of a man's foot, over seven feet long, and a like imprint is visible in the water of the sea within a distance of over three hundred 'li' from the mountain. The forest trees on the mountain, little and big, all bend towards it as if reverencing it.

"The products of Si-lan include cat's-eyes, red transparent glass, camphor, blue and red precious stones. The products of the soil are cardamoms, mu-lan bark and both coarse and fine perfumes. Foreign traders exchange them for sandalwood, cloves, camphor, gold, silver, porcelain-ware, horses, elephants and silk stuffs.

This country sends a yearly tribute to San-fo-ts'i." (Palembang in Sumatra.)

VII. By John de Marignolli, travelling during the early fourteenth century. (Translated from the Latin by Yule.)

"Now Paradise is a place that really exists upon the earth, surrounded by the Ocean Sea in the regions of the Orient on the other side of Columbine India, and over against the mountain of Seyllan.

"And from Seyllan to Paradise . . . is a distance of forty Italian miles; so that, 'tis said, the sound of the waters falling from the fountain of Paradise is heard there.

"On that very high mountain, perhaps after Paradise the highest mountain on the face of the earth, some indeed think that Paradise itself exists. . . . That exceeding high mountain hath a pinnacle of surpassing height, which, on account of the clouds, can rarely be seen. But God, pitying our tears, lighted it up one morning just before the sun rose, so that we beheld it glowing with brightest flame. In the way down from this same mountain there is a fine level spot, still at a great height, and there you find in order, first the mark of

Adam's foot ; secondly, a certain statue of a sitting figure with the left hand resting on the knee, and the right hand raised and extended towards the west ; lastly, there is the house of Adam which he made with his own hands.

"The garden of Adam in Seyllan contains in the first place plantain trees which the natives call figs. But the plantain has more the character of a garden plant than of a tree. It is indeed a tree in thickness, having a stem as thick as an oak, but so soft that a strong man can punch a hole in it with his finger, and from such a hole water will flow. The leaves of those plantain trees are most beautiful, immensely long and broad, and of a bright emerald green ; in fact, they use them for tablecloths, but serving only for a single dinner. . . . The leaves are some ten ells in length, more or less. . . . The tree produces its fruit only from the crown ; but on one stem it will bear a good three hundred. At first they are not good to eat, but after they have been kept a while in the house they ripen of themselves, and are then of an excellent odour, and still better taste ; and they are about the length of the longest of one's fingers. . . .

"There are also many other trees and wonderful fruits there that we never see in these parts, such as the Nargil. Now the Nargil is the Indian nut. Its tree has a most delicate bark, and very handsome leaves like those of the date-palm. Of these they make baskets and corn measures ; they use the wood for joists and rafters in roofing houses ; of the husk or rind they make cordage ; of the nutshell cups and goblets. They make also from the shell spoons which are antidotes to poison. Inside the shell there is a pulp of some two fingers thick, which is excellent eating, and tastes almost like almonds. It burns also, and both oil and sugar can be made from it. Inside of this there is a liquor which bubbles like new milk and turns to an excellent wine.

"They have also another tree called Amburan (the Mango), having a fruit of excellent fragrance and flavour, somewhat like a peach.

"There is again another wonderful tree called Chakebaruhe (the Jak), as big as an oak. Its fruit is produced from the trunk and not from the branches, and is something marvellous to see, being as big as a great lamb, or a child of three years old. It has a hard rind like that of our pine cones, so that you have to cut it open with an axe ; inside it has a pulp of surpassing flavour, with the sweetness of honey and of the best Italian melon ; and this also contains some five hundred chestnuts of like flavour, which are capital eating when roasted. . .

"The monks (Buddhist priests) never eat flesh. . . . They go naked from the loins upwards and unquestionably are very well conducted. They have

houses of palm-leaves, which you can break through with your finger, and these are scattered up and down in the woods, and full of property, and yet they live without the slightest fear of thieves, unless perchance there come vagabonds from foreign parts.

"These monks moreover never keep any food in their houses till the morrow. They sleep on the bare ground ; they walk barefoot, carrying a staff ; and are contented with a frock like that of one of our minor Friars (but without a hood), and with a mantle cast in folds over the shoulder in the manner of the Apostles. They go about in procession every morning begging for rice for their day's dinner. The princes and others go forth to meet them with the greatest reverence, and bestow rice upon them in measure proportioned to their numbers ; and this they partake of steeped in water with coco-nut milk and plantains. These things I speak of as an eye-witness : and indeed they made me a festa (festival) as if I were one of their own order."

VIII. By Sonchu de Rennefort, a Frenchman of the seventeenth century.

"Here we discovered the town of Colombo, well built, on the seashore, on flat ground ornamented with beautiful trees which make a very agreeable view. There was a great fortress at the side and eight vessels in the roadstead. . . .

"Communication with the king could easily be carried on from Battecalo ; for the town of Kandy where he lives is situated nearly in the middle of the island, two days' journey from Battecalo and two from Colombo.

"A good cinnamon plantation on the Battecalo side of Kandy belongs to the king and not to the Dutch . . . the western side giving more cinnamon than all the world could consume."

IX. By Sven Hedin, the great Swedish explorer, in his book, *From Pole to Pole*, published in 1908.

"About mid-day the coast of Ceylon can be distinguished on the horizon. From a long distance we can see the band of breakers dashing along the beach, and as we approach closer a forest of steamer funnels, sails and masts, and beyond them a long row of Asiatic and European buildings. That is Colombo, the capital of Ceylon, and a very important port for all vessels which ply between Europe and the Far East. . . . Sinhalese and Hindus swarm up the gangways, and throw themselves with much jabbering on the traveller's possessions. They are scantily clad, with only a shirt or a white sash round the loins and a cloth or a comb on the head.

"We go on shore and find in the principal streets of the town a curious

jumble of copper-brown coloured people, carriages, tramways and small two-wheeled rickshaws which are pulled by half-naked men. The huts of the natives and the dwelling-houses of the Europeans nestle among groves of the slender coco-palm."

X. By Count Keyserling, an Esthonian philosopher, in 1914, in *Travel Diary of a Philosopher*.

"I confess that the Buddhist Priest surprises me by the level to which he attains. . . . He possesses a gentleness, a capacity for understanding, a benevolence, an ability to rise above events. . . . Yet I realise that Buddhism is an impossible religion for Europeans. To be as creative and positive as Buddhism has been among the Sinhalese, the spiritual material must differ accordingly. In our case, we who say Yea to the world, who cannot rest, whose whole energy is kinetic, living for our own salvation would immediately develop into crass egoism, and the strife for Nirvana would manifest all the evils which dishonesty against oneself inevitably brings in its wake. Southern Buddhism is undoubtedly only suited to inhabitants of the tropics. . . . The wisdom with which it adapts itself to the soul of the people is amazing.

"But the wonder of wonders in Ceylon is the rock of Mihintale, where Mahinda, the son of King Asoka, the great apostle of Buddhism, spent and ended his days. This retreat—a narrow retreat on the highest point of the mountain, hewn by the hand of an artist out of the rock—is more regal than anything I have ever yet beheld. It is overshadowed by steep cliffs which descend abruptly to the valley in front of it. Beneath, the infinite primeval forest expands, whose holy silence is only broken now and again by the trumpeting of elephants. . . . It is impossible to spend even the briefest time in this place without progressing inwardly."

XI. By Marcel le Dentu, a French lawyer of Algiers, in *Voyage dans l'Inde*, 1926.

"In Ceylon, I must confess, I was greatly surprised at the sight of the men ; they have long hair, knotted like a woman's, with tortoiseshell combs to fix it in the nape of the neck, or with combs in the shape of crowns on their heads. They are decidedly small ; they have the graceful gait of the cat family ; and they wear bracelets and ruby earrings ; they are surrounded by drapery like that of a woman. Seen from the back, their silhouette is feminine : but do not pass them in the street ; the sight of their moustaches will make you drop back brusquely lest you might seem rude ! But one characteristic is common to all men of the Indian area ; they have an air of distinction.

"In Ceylon they are atheists and have a clergy dressed in robes of saffron yellow, religious ceremonies and pagodas. The most curious of these is that of Isipatanaramaya in Cinnamon Gardens, Colombo. Isipatanaramaya ! a truly local name ! If you want to speak to the people only fire off a series of syllables ending in 'a' and change their consonants as you proceed ; everyone will then understand you !

"The edifice is rectangular in form. Outside, on one side is a portico; inside a gallery runs along the four sides containing quantities of Buddhas, all small, all the same, and placed indefinitely one after another, while the walls present the whole life of debauchery, then of sanctity, of a converted prince. Here and there are tables of white marble engraved in black characters in the English language, dedications to a husband or a deceased mother. Some jasmine flowers are strewn upon them and drops of water. The central sanctuary is occupied by two terrible standing giants, brandishing arms and encircling a Buddha ten metres long, lying down, all yellow, his eyes open, fixed, as big as coconuts. The impression one gets is of nothing but fear. . . .

"I have experienced these (tropical) showers where every drop was like a bucket of water falling on my head ! One day, at Colombo, I was wet, not merely like a man who has been *dipped* into water, but like one who has *lived* in it. I returned to the hotel to change my clothes. The rain had just ceased. On the way back, however, my clothes dried and I did not need to change !"

These extracts need no comment. They are but a few of the many references to Ceylon in geographical literature. They serve to show its importance since the dawn of recorded history, and also the various features of the island which have interested travellers, and the kind of impression they have carried to their respective homes.

PART I. CHAPTER 2

NAMES OF CEYLON

"LANKA," a Sanskrit word, the Sinhalese name for Ceylon (Ilam or Elankai, in Tamil), seems to have originated at a very early date ; it is used in the Ramayana, a legendary history of Southern India and Ceylon, relating to events dating back to about 3000 years ago. The name of Lankapura, the chief city, was apparently in use by the aborigines when Vijaya landed, during the sixth century B.C. The names of the principal characters in the Ramayana —Rama, Ravana and Sita—are perpetuated in many names of places and people, *e.g.* Rameswarem (in English called Adam's Bridge), Maha and Kuda Ravana Kotuwa (Great and Little Basses), Sitawaka, Sita Kanda, etc.

At the beginning of the sixth century A.D. a priest, Mahanama, compiled a history of Ceylon, which he wrote in Pali, one of the most ancient classical languages of the Indian area, which has greatly influenced Sinhalese. It was later added to by other people, and is known under the name he gave it—Mahawansa. Like most early histories, it is full of exaggerations ; but it forms one of the most valuable and fascinating historical documents in the world, especially as a large number of the details in it can be verified in the ruined monuments of the island. Though lost for many centuries, it has in recent years again become well known and beloved by the Sinhalese people.

The following quotations from Geiger's translation of the Mahawansa deal particularly with place names. The Roman name of "Taprobane," which occurs in so many old documents, appears to have been derived from "Tambapanni" mentioned below.

About B.C. 543, "when those who were commanded by Vijaya landed from their ship, they sat down wearied, resting their hands upon the ground. And since their hands were reddened by touching the dust of the red earth, that region and also the island were (named) *Tambapanni*. But the king Sihabahu" (father of Vijaya, who had exiled his son from his realm in the Ganges Basin) "since he had slain the lion (was called) *Sihala* (or Sinhala) and by reason of the

ties between him and them all those (followers of Vijaya) were also (called) *Sihala*" (or Sinhala—hence the term Sinhalese).

"Here and there did Vijaya's ministers found villages. *Anuradhagama* was built by a man of that name near the Kadamba River; (now known as the Malwatte Oya). The chaplain Upatissa built Upatissagama on the bank of the Gambhira River to the north of Anuradhagama. Three other ministers built each for himself Ujjeni, Uruvela and the city of Vijita" (the latter identified as a site twenty-four miles south of Anuradhapura). When the Pandu king's daughter landed at Mahatittha (the great landing place, now Mantota) Vijaya turned out Kuvanna, the Yakkhina with her son and daughter. She was killed by the Yakkhas at *Lankapura* and the children fled to Sumanakuta (Adam's Peak). Here they dwelt in Malaya (central mountain region, old province name) and gave rise to the Pulinda (barbarous tribe, possibly the Veddhas) (The Sanskrit synonym for 'pulinda' is 'sabara' and hence the province name 'Sabaragamuwa').

"When he had forsaken his former evil way of life, Vijaya, the lord of men, ruling over all *Lanka* in peace and righteousness, reigned as is known in the city of Tambapanni thirty-eight years."

Ceylon appears consistently on nearly all the early maps of the world or of the Indian Ocean. One of the best of these was made by Ptolemy, an Egyptian, in the second century A.D. He called the island "Taprobane," having learnt of it through the Romans, who, for several centuries B.C. carried on trade with the far east, and during the first century A.D. came in contact with the Chinese. There is probably no place that occurs so frequently or is so correctly situated on ancient maps as Ceylon. Its size, however, was usually incorrectly estimated, as will be seen by the accompanying reproduction (Fig. 2).

The Romans also used the name 'Palaisimundü.'

Hindus seem to have used the name "Sieli-diba" for Ceylon (connected, no doubt, with the Sanskrit "Sinhala-dvipa" = Island of Sinhali), and from them the Arabs are said to have acquired the name of "Serendib," which with variations, *e.g.* "Selendive" appears in many works of travel. The inhabitants of Ceylon have never been sea-farers, and since early times Arabs settled on their coasts and traded. The Kandyan Sinhalese had very little contact with the outer world, and even the Low Country people lived their lives quite separately from the traders, who followed a completely different religious code. Arab settlers evidently had much more to do with the Hindu traders, who began a little later than the Arabs to take trading ships to the coast of Africa

FIG. 2.

This is a reproduction of Ptolemy's map, showing Ceylon as Taprobane. The large size of the island is some indication of its ancient importance. This map was used for many centuries by ancient geographers; the names are in Latin, the language of the Romans.

by the aid of the monsoons. From the Arabs, the Portuguese and Dutch are said to have acquired their names of "Celiao" and "Zeilan," which the English and French converted into "Ceylon" and "Ceylan." Tamils use "Elankai." The Chinese seem to have used the term "Si-lan"; they also used "Lang-ya" for Lanka, and "Shi-tyi-kuo" to translate "Kingdom of the Lion."

The people of Lanka are called by the English "Sinhalese," which is an adaptation of the word meaning "lion race" in the Sinhalese language. Sometimes the first part of the word is rendered as "*Cing*halese or *Sing*halese" in English, in which case it is correctly transliterated from the vernacular characters, but is liable to be mispronounced by English people. The "g" is hardened and the "h" omitted and it becomes "Singalese" instead of "Sing-halese; it is therefore probably better to use the version "Sinhalese" and avoid this complication.

NOTE FOR ENGLISH READERS

Sinhalese words are pronounced with rhythm, and as a rule no syllables are accented. In the transliterated names "i" = "ee"; "ai" = Eng. "i"; "e" resembles French "é" and is always pronounced—*e.g.* Panadure = Paa-na-doo-ré; "u" = "oo." Pidurutalagala = Pee-doo-roo-tha-laa-ga-la; (there are long and short "a's" in Sinhalese); "ng" usually go together, *e.g.* Ganga = Ga-nga; "g" is always hard; "dh," "th" are aspirate forms of "d" and "t," and not pronounced as in English. Sometimes the "h" is separate as in Ginigathena = Gee-nee-gat-hé-na. "w" and "v" are represented by one symbol in Sinhalese, and hence are to a certain extent interchangeable—*e.g.* "Ravana" might be "Rawana," "Moratuwa" or "Moratuva"—usually it is more like "w."

PART I. CHAPTER 3

THE RELATION OF CEYLON TO EARLY ASIATIC ROUTES

China has a very extensive ancient literature ; but owing to the difficulty of the language it is almost unknown to people of other countries. It would, no doubt, throw a great deal of light on the historical geography of Asia, but as yet only a few works have been translated into European languages. These works, however, enable us to conclude that at the dawn of European history the Chinese were amazingly active, and produced both navigators and land travellers of great ability. Their exploits are outstanding in world history.

Ceylon is, of course, connected with their sea trade routes, but in order to understand its relations with China we must get a broader view of the relations between the various countries of Europe and Asia in early days.

Land Routes across Asia appear to have developed first and to have existed at the very dawn of recorded history ; for it is affirmed that articles of Greek workmanship which scholars attribute to pre-historic man of the Neolithic Age have been found as far from Greece as Mongolia ; and a very ancient race, the Sabaeans, in the tenth century B.C., are said to have traded with the Indians. These, however, are matters of conjecture. When we come to consider China we have definite records of trading activities. For instance, they had established customs-barriers round their coasts and borders by B.C. 522 and held fairs on their land frontiers for trading with other countries by B.C. 140. Between 160 and 110 B.C. a Chinese called Chang-k'ien crossed Asia from east to west and arrived in Turkestan, which for several centuries B.C. had been a trade depot for exchange of goods via the near eastern countries (Persia, Arabia, Syria, etc.) with those of the Mediterranean area. The Chinese were always sending out " feelers " for trade and military purposes into the lands near the Caspian and by sea towards the East Indies.

Though the Sinhalese themselves seem to have travelled little out of their own land they always allowed traders to settle on their shores ; they were a

civilised people almost from the time when Vijaya (B.C. 543-505) as we read in the quaint historical passage, " had forsaken his former evil way of life " and

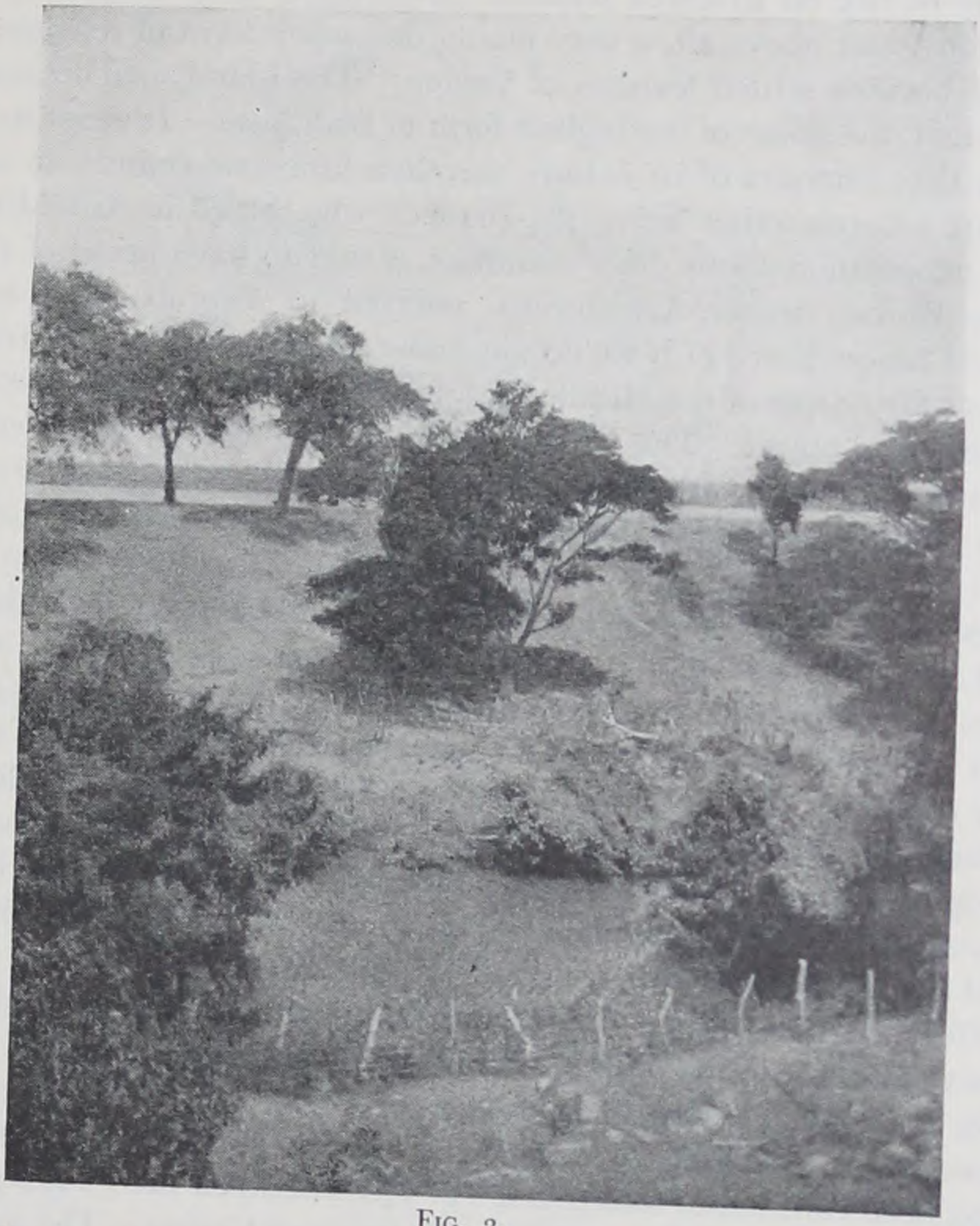


FIG. 3.

The Bund, or Barrage, of Tissa Wewa [Tank] at Anuradhapura, built just before Fa-hsien visited Ceylon. The dimensions can be judged by the very large trees growing on it. In the foreground is the canal leading to the paddy fields.

" ruling over all Lanka in peace and righteousness, reigned, as is known, in the city of Tambapanni, thirty-eight years." He had come from a part of India which was already comparatively civilised, but whose people, belonging to an

area in the Indo-Gangetic Plain which was away from the sea, had no seafaring instincts. Very soon an elaborate series of storage tanks for irrigation, the culture of rice on irrigated terraces (involving a great amount of skill in construction), and above all, a very highly developed form of religion, Buddhism, had become settled features of Ceylon. The island soon became, and has remained, the home of the highest form of Buddhism. It is not surprising therefore, that rumours of its culture travelled from one country to another. Herodotus, a Greek writer living 484-404 B.C., who settled in Asia Minor and collected information about other countries, is said to have heard of Ceylon ; while the Roman writer, Onesicritus, referred to Taprobane in B.C. 330. When the Chinese heard of it we do not know ; quite possibly they reached it long before the people of the Middle East, for they had sought the country with quite a different object. The Chinese have always been deeply interested in religion and philosophy, and were anxious to learn what they could from other countries. When, through the various ascetics who retired for meditation into the heart of Central Asia, they heard of Buddhism, they soon began to send emissaries to India or Ceylon to learn about it ; and on discovering that it was a much higher type of religion than their own, they readily adopted it, and some of the most wonderful journeys ever made in the world were accomplished by Buddhist missionaries to and from China and India or Ceylon in search of religious teaching. No one knows exactly when these missions really began, and unfortunately for geographers, the emissaries wrote but brief descriptions of the countries they saw on the way ; their aim was to get the teaching, and they usually only described their religious experiences or the temples and priests at the various places they visited. There is, however, a record in A.D. 65 to the effect that the Chinese Emperor sent an express mission to India and in two years' time his ambassadors returned with priests. From that time onwards for ten centuries these missions were common, and through the Buddhist priesthood, who established a series of isolated monasteries in Central Asia, there has been continuous intercourse via Tibet between the Buddhist scholars of Japan and China and those of India, Burma and Ceylon. The influence of Buddhism also spread eastwards through Java and the Pacific Islands and may have reached Central America. It is impossible to over-emphasise the important part that Buddhism has played throughout the ages in establishing communication between the various parts of Asia. This aspect of Asiatic history is little known to the people of Europe, who have paid more attention to the spread of trade. Ceylon, which early became the repository and

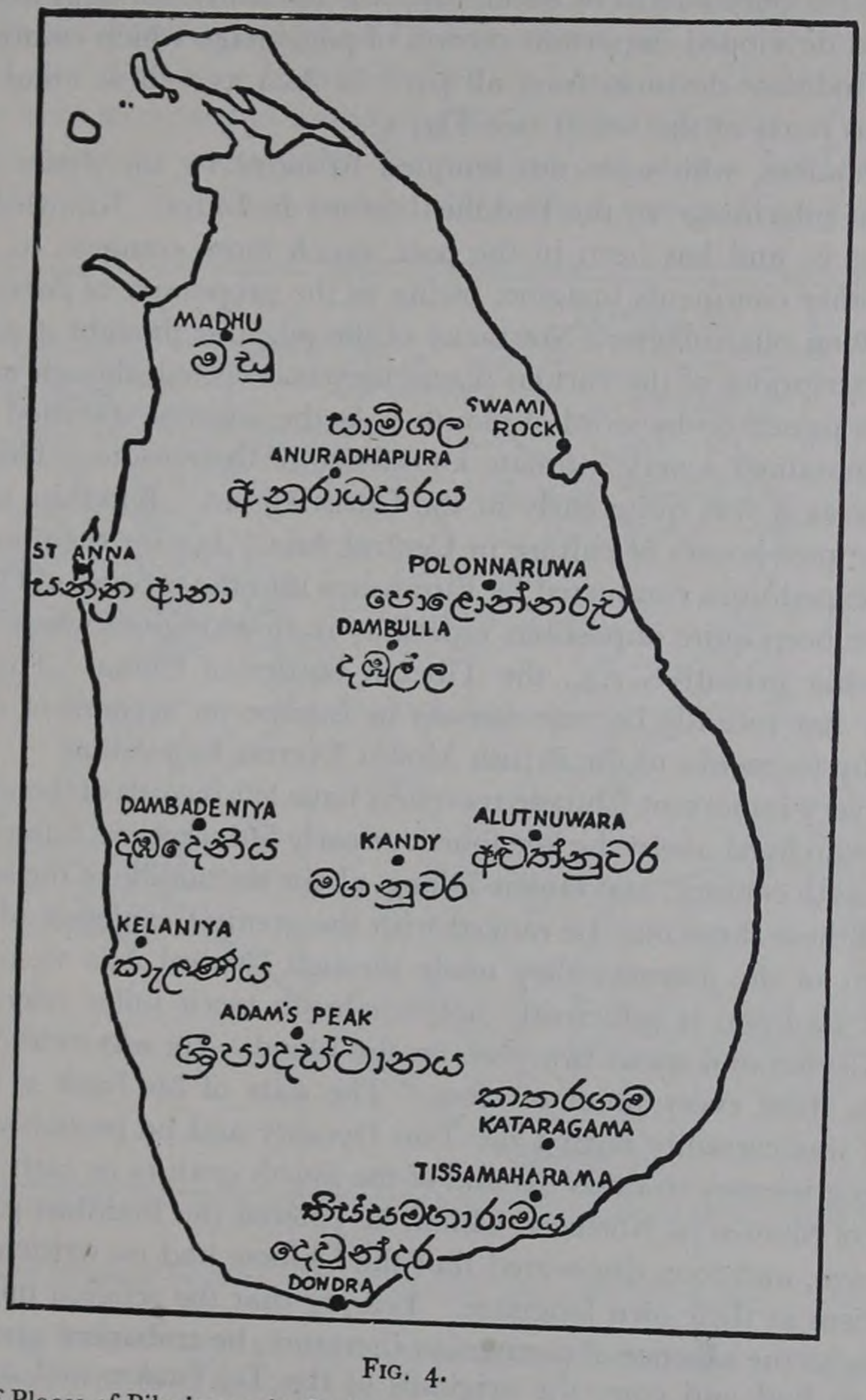


FIG. 4.

The Chief Places of Pilgrimage in Ceylon. They are all extremely ancient, except the Christian shrines at Madhu and St. Anna.

Footnote.—In Fig. 4, Sinhalese for Adam's Peak transliterates as "Sri Paadastaanaya."

guardian of the purest form of Buddhism, was naturally the objective of many missions and developed important centres of pilgrimage which continue to-day to attract Buddhist devotees from all parts of Asia as well as other travellers from various parts of the world (see Fig. 4).

The Sinhalese, who were not tempted to move by the desire for trade, travelled on pilgrimage to the Buddhist shrines in India. Knowledge of far-away places is, and has been in the past, much more common in Asia than people of other continents imagine, owing to the propensity of Asiatic peoples for taking long pilgrimages. Not many of the pilgrims thought it worth while to write descriptions of the various places they had visited, though much information was passed on by word of mouth. As the pilgrims travelled mainly on foot, they obtained a very intimate knowledge of their route. This is just as true to-day as it was quite early in the Christian era. Buddhist monasteries are still the post-houses of culture in Central Asia ; but for them many of the exploring expeditions conducted by Europeans into the recesses of Central Asia would have been quite impossible, especially in those regions where the people are somewhat primitive, *e.g.*, the Tibetan border of China. The Rongbuk Monastery has recently become famous in Europe on account of the services rendered by its monks to the British Mount Everest Expedition

Three very important Chinese travellers have left records of their journeys—Fa-hsien, who lived about the late fourth or early fifth century, Sung-yun, about the early sixth century, and Huien Tsiang, about the middle of the seventh century. All these three may be ranked with the greatest explorers of the world, on account of the journeys they made through Central Asia to India. The exploit of Fa-hsien is sufficiently noteworthy to merit fuller reference, as he reached Ceylon and spent two years in the island. He was indeed a remarkable man, from every point of view. The date of his birth is not known, though it was certainly during the Tsin Dynasty and he probably performed his amazing journey towards the end of the fourth century or early in the fifth. A native of Shan-si in Northern China, he entered the Buddhist priesthood at an early age, and soon discovered that the Chinese had no written documents of Buddhism in their own language. Fearing that the religion might degenerate owing to the absence of permanent literature, he embarked upon a journey to India to find and copy the originals of the Tri-Pitakas and a number of other books, and to translate them into Chinese. This work would involve learning Pali and Sanskrit, the classical languages in which the records of the teaching of Buddha had been written. The journey took fifteen years, the out-

ward way being by land, through Central Asia, and the return by sea via Sumatra. In his account ancient or Chinese names are used for most of the places visited, but they have been identified by Legge and Giles, two English scholars who were interested in translating his work into English. The accompanying map shows the route which they worked out, with a few of the more important places that he visited, under their modern names (Fig. 5).

FIG. 5.

The Route of Fa-hsien. [Scale approx. 1000 miles to 1 inch.]

The following extracts from Legge's translation of Fa-hsien's *Travels* illustrate some of the features of his journey :

" After Fa-hsien set out from Ch'ang-gan, it took him six years to reach Central India ; stoppages there extended over other six years ; and on his return it took him three years to reach Ts'ing-chow. The countries through

which he passed were a few under thirty. From the sandy desert westwards on to India, the beauty of the dignified demeanour of the monkhood and of the transforming influence of the Law was beyond the power of language fully to describe ; and reflecting how our masters had not heard any complete account of them, he therefore went on without regarding his own poor life, or the dangers to be encountered on the sea upon his return, thus incurring hardships and difficulties in a double form. He was fortunate enough, through the dread power of the three Honoured Ones, to receive help and protection in his perils ; and therefore he wrote out an account of his experiences, that worthy readers might share with him in what he had heard and said."

Crossing the Lob Nor Desert, part of the Tarim Basin—

"Le Hao, the prefect of T'un-hwang, had supplied them with the means of crossing the desert before them, in which there are many evil demons and hot winds. Travellers who encounter them perish all to a man. There is not a bird to be seen in the air above, nor an animal on the ground below. Though you look all round most earnestly to find where you can cross, you know not where to make your choice, the only mark and indication being the dry bones of the dead left upon the sand."

Crossing the N.W. Frontier of India—

"The snow rests upon them (the frontier mountains), both winter and summer. There are among them venomous dragons, which, when provoked, spit forth poisonous winds, and cause showers of snow and storms of sand and gravel. Not one in ten thousand of those who encounter these dangers escapes with his life."

Through the medium of Sanskrit Fa-hsien would be able to converse with most of the priests in the various monasteries on the way, and he spent three years in Patna perfecting himself in this language, in order to study the religious works ; here he found and copied a number of the Vinaya rules. Then he learnt that the chief Buddhist works had been preserved in Ceylon, and decided to make his way there. The Tri-Pitakas had been committed to writing at Aluwihare in Ceylon during the first century B.C. He visited a large number of shrines in the Ganges Basin, including those at Gaya, and embarked at the mouth of the Ganges on a boat which took him to Ceylon. Here he spent two years, mainly in the neighbourhood of Anuradhapura, copying the Tri-Pitakas and a number of other works which were written down in ola leaf books. Many of these books are still in existence, and form some of the most important documents in the world. His observations on Ceylon have

already been quoted. He finally embarked on a boat with some merchants who were travelling to Sumatra, and in ninety days they reached Java, where some other merchants agreed to take him to Canton. Owing to the terrible storms which they experienced in the typhoon seas they were blown out of their way, and eventually arrived on the Shantung Coast in a starving condition. Fa-hsien managed through all these difficulties to cling to his documents, even though he threw all his other luggage overboard. He died at the Monastery of Sin in North China at the age of eighty-eight years.

We are impressed by the bravery of modern explorers, but it is not to be compared with that of Fa-hsien, who set out into unknown lands with only three companions, who died on the way and left him to complete alone a journey of between twelve and fifteen thousand miles. Nowadays explorers have quite a luxurious time, as they can take tinned provisions, heating apparatus, water filters, means of locomotion, and can even keep in contact with the rest of the world by means of wireless apparatus. Fa-hsien, on the other hand, would know practically nothing about the extremities of Central Asian climate, would have to carry all his own luggage, and probably walk a great deal of the way. He would have to rely upon gifts of food, and go hungry or thirsty for many days ; he would also have to pass through lands where the people were wild and cruel, and liable to rob or torture him. The account of his journey is of exceptional interest through the light it throws upon remote parts of Asia, on the condition of the people, and on the routes then in use.

FIG. 6.
Aluwihare, where the Tri-Pitakas were committed to writing during the first century B.C.

To a friend in China he afterwards said, " Looking back upon what I went through, my heart throbs involuntarily and sweat pours down. But that in the dangers which I encountered, whether riding or on foot, I did not spare my body, was because I kept my object steadily in view and concentrated upon it in a simple honesty of purpose. And so I could risk my life in places where there was no certainty of escape, in order to accomplish even a minute fraction of what I had hoped for."

His friend adds the following inspiring comment on this great man : " This kind of man has been rare in all ages. From the time that the great religion began to flow eastwards, there has been no one forgetful of his life in the cause of Faith to be compared with Fa-hsien.

" Thus came I to know that there are no obstacles, however numerous, which the power of sincerity will not break through, and no meritorious services which the stimulus of determination will not achieve. And the man who brings his labours to a successful issue—is he not one who neglects the things which are generally prized, and prizes the things which are generally forgotten? "

It is naturally a matter of great regret to geographers that Fa-hsien was more interested in religion than in geography.

We seldom hear of the ancient Sinhalese going long journeys to other countries. They probably heard as much as they desired from the various people who visited them ; they had not the same stimulus to travel as the Chinese, who were so cut off from the rest of the world by immense natural barriers that at the beginning they thought themselves to be the only men in existence. In A.D. 72, however, we are told that a Roman ambassador, Annius Plocamus, was received with courtesy in Ceylon, and through him the Sinhalese were induced to send four ambassadors to Rome, who appeared to have created a great deal of interest and told of their trade with the Seres, or Silk People, as the Chinese were then called. Not long after this, the Chinese, in A.D. 98, sent a messenger to try to find out something about the Ta-t'sin, as they called the Romans ; he reached Gujerat in India and set sail in a ship, which, however, was wrecked. They afterwards had more to do with the Romans through the trade with Turkestan, especially after Alexander the Great had pushed his conquests as far as Northern India.

The Arabs were the first people to navigate the open ocean, owing, no doubt, to their skill in orienting themselves on desert routes by the stars. They soon discovered the use of the S.W. and N.E. monsoons to their sailing vessels, and gave up the old coastwise method of navigation which took them all round

the coasts of Persia and India in order to reach Ceylon. When they discovered these winds we do not know, but the name of the first Roman who ventured to make use of them is on record, and no doubt the Arabs had already tried. "About A.D. 47, Hippalus, a seaman in the reign of Claudius, observing the steady prevalence of the monsoons which blew over the Indian Ocean alternately from E. to W., dared to trust himself to their influence, and departing from the coast of Arabia, he stretched fearlessly across the unknown deep and was carried by the winds to Muziris, a port on the coast of Malabar, the modern Mangalore." So long as the trade depended upon sailing vessels there was always a certain amount of rivalry between the claims of Ceylon and Malabar to form the site of the chief trade depot for the Indian Ocean. Ceylon was on the more direct route to the Far East, had accessible lowlands, could produce more food than it needed, and had amiable people who allowed traders to settle. Malabar, on the other hand, was a point to which sailing ships seemed to veer naturally; and though its people were more aggressive, the claims of the ports Mangalore, Calicut and Goa were strong, even though they were cut off from inland communication by the long unbroken wall of the Western Ghats. Calicut had the strongest claim owing to its proximity to the Palghat Gap which led into the Dekkan between the Nilgiri and Cardamom Hills. When Vasco da Gama arrived at Calicut he initiated the long series of Portuguese relations with the Malabar coast which led to its becoming the scene of conflict between the different European powers for trade supremacy in the Indian Ocean.

Fa-hsien's return journey by boat with traders shows us that in the fourth century the Chinese had already established trade relations with Ceylon. They exchanged goods with the Arabs, who had gradually developed settlements of their own all round the shores of southern Asia as far as Sumatra, and by the seventh century had succeeded in reaching Canton. These Arab traders became known as Moors, and their descendants, who are still very numerous in Ceylon, form the chief trading community of to-day; the buying and selling of gems is still in their hands, and they are distributed in coastal settlements or keep shops along the main roads of the island. They still utilise for their trade picturesque sailing ships, which can be seen outside the smaller ports like Kankesanturai. They still live their lives quite separately from the Sinhalese.

The chief centres of Arab trade were Berenice [now deserted] on the E. Red Sea coast near the Tropic of Cancer, Galle in Ceylon, and Palembang in

Sumatra. Later on, when Sumatra and Singapore came to be visited by more ships from the west, the Chinese did not trouble to go so far as Ceylon, and contented themselves with trading with the Arabs in Malaya. We find no trace of them at present in Ceylon, while Singapore, now the greatest trade centre in S.E. Asia, is half populated by Chinese, who bear the same relation to the country as the Moors do to Ceylon.

The rise of Muslim power in the middle East in the seventh century led to the gradual cutting off of the overland trade routes from China via Turkestan. The Tartars tried to keep them open, but finally during the fourteenth century they themselves were converted to Islam and the route successfully closed. For a long time this valuable land route across Asia has been in disuse, but recently it appears to be reviving in connection with the development of air routes and railways. The railways from Constantinople to the Persian Gulf, from Moscow to Khokand with the possible connection with the Indian lines via Quetta, are bringing trade and travellers in their wake. The Russians have constructed a railway linking Turkestan with N. Siberia. In 1926 Sir Alan Cobham succeeded in establishing an air route to Australia via Baghdad, the Persian Coast, Karachi and Rangoon.

The closing of the Asiatic land routes and the decadence of Turkestan led to the development of sea routes to the East, in which Ceylon played an increasing part. For a time in the ninth century it was supplanted by Calicut and Travancore, and later trade fluctuated from time to time between the two areas. The Chinese gradually retired to the Malay area and left free the field for West European traders who began to arrive in the fifteenth century. Hitherto the Arabs had always been intermediaries between the traders from Eastern Asia and those from Europe. Now began direct contact of the European nations with the East, which led to the conquest of India, Burma, Ceylon, parts of Malay and E. Indies and French Indo-China. Almost the last we hear of Chinese relations with Ceylon is the account in A.D. 1405 of the visit of a Chinese general to the Buddhist shrines. He, however, barely escaped with his life, for Ceylon was then in a very unsettled condition. On returning three years later to avenge the injuries he had received, he captured the King and Queen and many of their followers, and took them back to China. The Emperor, however, only sent them back on a promise that their throne should be bestowed upon the wisest of the captive king's family ; this proved to be Parakrama Bahu VI, one of the most able kings of Ceylon. On this trip the King and Queen no doubt collected many new ideas.

PART I. CHAPTER 4

FOREIGN INFLUENCES ON CEYLON

CONSTANT need for intercourse with foreigners has caused the Ceylonese to give a good deal of attention to languages. Even as early as the fifteenth century we hear of Sri Rahula, one of its most noted scholars, knowing six languages besides his own. And to-day quite a large number of people can either read and write, or speak Sinhalese, English and Tamil, and have a knowledge of Pali and Sanskrit. They also now acquire other European languages by travel in Europe. Constant intercourse with foreigners has also helped to make the inhabitants of Ceylon more adaptable and less conservative than their Indian neighbours; many of the ancient rules of life, such as those imposed by the caste system, have come to be much more loosely observed than in India. Adaptability is often a characteristic of island people situated on a frequented trade route, as distinct from their inland continental neighbours; and so we find that many of the obstacles in the way of progress which exist in India do not exist in Ceylon. The caste system, suited to meet the difficulties of a land with mixed races and peoples of mixed attainments, and now becoming unnecessary through the spread of education, commenced to disintegrate much earlier in Ceylon than in India; old ideas of feudalism and race prejudice are also dying an easier death. These changes are now taking place very rapidly—more rapidly, perhaps, than is realised by the rest of the world. Though still essentially an agriculturalist the modern Ceylonese is very different from his forefathers, and the change has probably been accelerated by a new tendency to travel; he is no more of a sailor, trader, or navigator, than his ancestors, but he travels as a gentleman for purposes of education, and during the last hundred years this has had a fundamental effect on the development of Ceylon, the fruits of which are only just becoming evident.

Foreign intercourse has not, however, been an unmixed blessing to the Ceylonese. Owing to the island's favourable position for trade in the Indian

Ocean it has been coveted by the aggressive commercial nations and ravaged by invasions since the beginning of its history. It is indeed a wonder that any of the essential characteristics of Sinhalese culture have ever emerged. The history of Ceylon is that of one long conflict between ideals and realities on the part of a people who early came under the peaceful influence of a religion which

FIG. 7A.
Hindu Temple at Dondra.

taught them not to kill, but were forced to abandon their ideals and make war or the evasion of enemies their chief business. Each invading army left some imprint of foreign culture, and it is now extremely difficult to determine what elements in native life are really Sinhalese, for almost every aspect of life has been affected.

Tamil and Malabar influences in Ceylon have been strong from the first, but they have not been confined only to warlike relations. Tamil invasions are

the chief feature of the early history. The Tamils were partly responsible for the abandonment of certain areas of the tank country. It was probably also due to periodic droughts. Varthema, the Italian traveller, records that in 1505, when he visited Ceylon, the tanks were in disrepair and rice was imported from India. The Tamils formed a permanent settlement in the Jaffna Peninsula

FIG. 7B.
Buddhist Temple at Dondra.

which later became famous on account of the distinctive character of its people ; the Jaffna Tamils form one of the most interesting communities in the world on account of the remarkable way in which they have developed this small region so poor in physical resources. In addition, there always has been a large amount of peaceful intercourse with the Tamils. The Sinhalese kings often married princesses from South India, and as the Tamils were Hindus of the Sivite cult by religion, they would provide their consorts with the means

of carrying on worship within the precincts of Buddhist temples. This might seem to some people a peculiar thing to do, but we must remember that toleration in religion was taught by Buddhism, and has probably always been a characteristic of the Sinhalese people; also that Buddhism grew out of Hinduism and is in no way antagonistic. Pieces of Hindu ornamentation or statuary are to be found in nearly all the old Buddhist temples. Sometimes there is a small separate shrine within the temple, as at Aluwihare. At Dondra we have a separate temple side by side with the Buddhist wihare; this, however, was probably a result of the revival of Hindu culture at different periods in history. Whenever Buddhism was on the wane, older cults would tend to revive.

Another permanent influence is due to the importation of Tamil and Malabar labour to Ceylon. For some curious reason, probably connected with the climatic environment, the Sinhalese have, as a nation, always avoided certain kinds of work if possible. They were, for instance, non-maritime; and there is said to be quite a lot of Tamil or Malabar blood in the coastal fishing communities, because these people were brought in by the Sinhalese kings and princes to carry on fishing and navigation.[1] Again, the rickshaw trade has remained almost entirely in the hands of Tamils, and it is rare to find a Sinhalese, however poor, who cares to pull a rickshaw. In later years there has arisen the difficulty of obtaining agricultural labourers for the new tea and rubber plantations run by the Europeans. Very few Sinhalese have undertaken this work, chiefly because they are themselves usually landowners. The surplus population of South India has entered Ceylon for this purpose in increasing numbers in recent years; at the last census (1946) Immigrant Indian labourers formed 10·2 per cent. of the total population of Ceylon. The coming of these people has caused the development of a new series of villages, especially in the hill country, with shops that cater for Tamil tastes in clothing, food, etc. and Hindu temples and schools. Maskeliya is typical.

It was not, however, until the coming of **Europeans** to Ceylon that Sinhalese culture was seriously in danger of losing its identity. The Indians had a related form of culture, but the Europeans brought new habits and modes of thought which they were, at that period, anxious to impose on the whole world. The arrival of the Portuguese Vasco da Gama at Calicut in 1498 opened a gateway of free access to Asia from Western Europe. Hitherto all intercourse with Asia had depended upon a series of middlemen, and Parthians, Phœnicians, Turks,

[1] This may be only hearsay. It is not impossible, but difficult to verify.

Persians, Syrians, Arabs, Jews, Armenians or Egyptians had all in turn exacted their toll of profit. The opening of the Cape Route to India freed the European traders from these middlemen ; it also, however, necessitated the founding and safeguarding of trading stations in the East, comparable with those of the Moors. Very rapidly one nation followed another, all eager to trade along this route. The Portuguese arrived in Ceylon in 1506, reached Malacca two years later, and by 1617 reached China. Meanwhile, from the other direction, Magellan had discovered the Philippines. In 1529 the first French boat arrived at Sumatra. In 1576 Frobisher reached India, and in 1589 occurred the first recorded visit of an English merchant to Ceylon. Shortly afterwards, the Dutch sent trading vessels to India, and in 1601 founded a trading company at Singapore, which soon pushed its operations on to Canton. Only the previous year the British had founded the British East India Company, which became such a powerful factor in the determination of India's destiny. Ceylon and India after the sixteenth century became the scene of conflicting commercial interests which have continued to the present day. Trade emissaries of the Europeans were followed up by religious missionaries, who, like the Muslims, introduced the note of religious aggression into many countries of Asia. Traders and Christian missions everywhere worked hand in hand, spreading European influence. The Portuguese introduced missionaries into Ceylon as they conquered the lowlands, and after 1518 a stream of Roman Catholic priests endeavoured to aid the Government in destroying what they then called "heathenism," what we now call "characteristic native culture," in order to replace it with their own form of culture. The successive operations of the Portuguese, Dutch, and British in Ceylon can be studied in a text-book of history. Suffice it here to emphasise some of the more important geographical aspects of the question.

In the first place we must note that their complete domination of the lowlands of Ceylon increased its importance as a stepping-stone across the Indian Ocean. World trade came gradually into the hands of the greatest navigators on the high seas, and hence to the West Europeans. They were more safe in Ceylon than anywhere else, and in spite of the favourable position of the Malabar Coast in relation to the monsoon winds, the question of safety drew them more and more to the island. That the Sinhalese thought they had nothing to fear from European traders is evident from the fact that they allowed the Portuguese to make a trading station at Colombo. The latter, on the other hand, took advantage of this courtesy to build a fort and bring

military forces to protect their traders. When the Sinhalese enlisted the help of Dutch or British against the rest, little was it realised that these nations also had the same aggressive aims. One after another they made their attempt to kill the Sinhalese culture and substitute their own. The fine system of irrigation tanks was finally abandoned as a result of the advance of rapacious invaders only anxious to collect their toll of the

FIG. 8.

Disused Tank near Tissamanarama. Note the low hills in background. These resemble the hills shown in contour in Fig. 30.

island's treasures; the people were driven by degrees into the hill country and to the more moist and less healthy parts of the lowlands, while at the same time their morale was almost lost. Continual movement of the population and the destruction of crops and buildings struck the tree of progress at its very roots. Temples had been destroyed, cities and historical monuments ruined, and the faith of the people rudely shaken. The chief ruined cities are shown in Fig. 9. By the seventeenth century Buddhism had become so corrupt that a Buddhist priest married the queen, murdered her eldest son, and

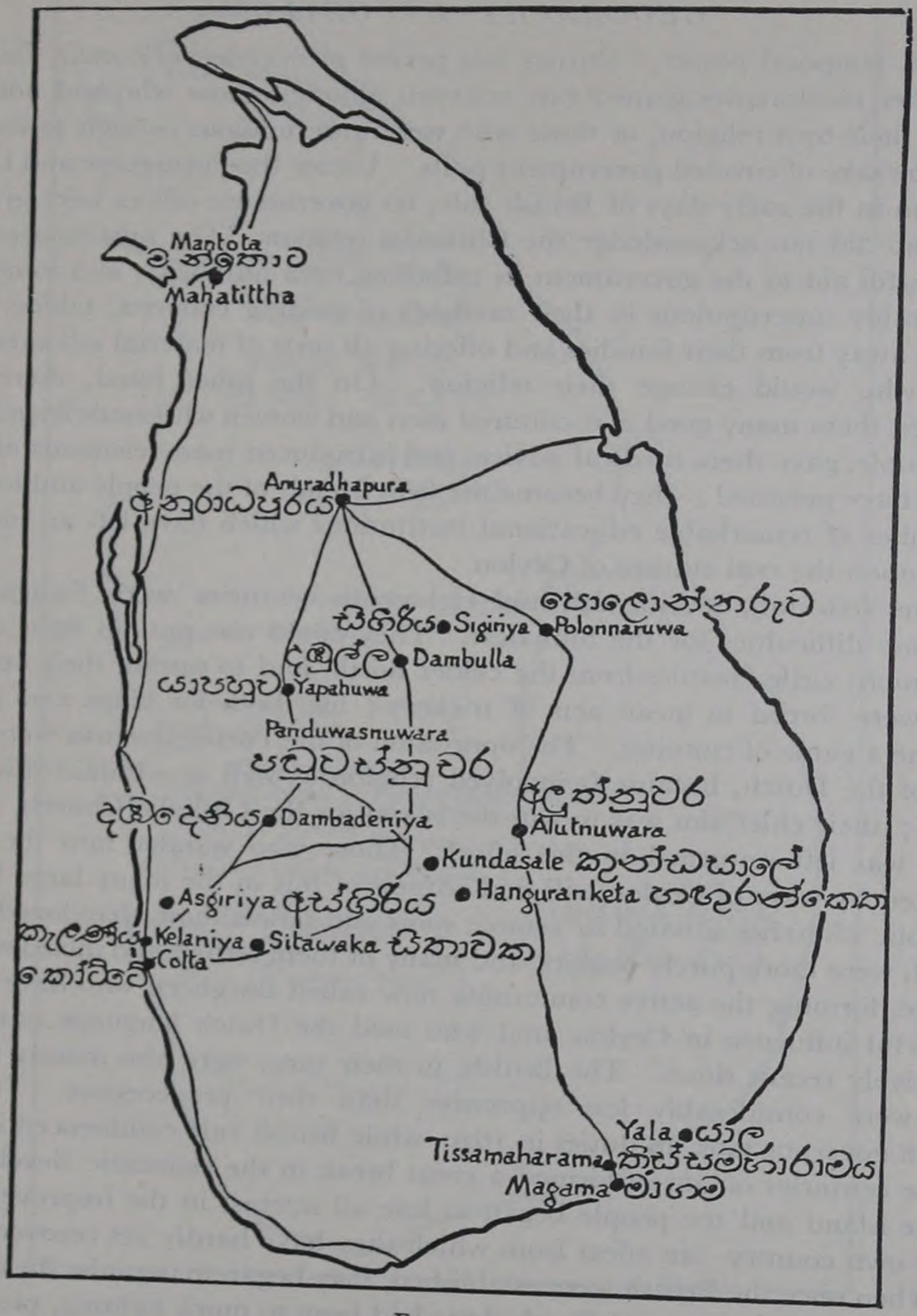


FIG. 9.

Chief Ruined Cities and the Ancient Roads indicated in the Mahawansa. Sitawaka is near the modern Avissawella. Compare with modern routes and towns.

assumed temporal power. During this period of decadence Roman Catholic and other missionaries gained easy converts amongst those who had not been taught their own religion, or those who were unscrupulous enough to sacrifice it for the sake of coveted government posts. Under the Portuguese and Dutch, and also in the early days of British rule, no government offices were given to any who did not acknowledge the Christian religion. The missionaries were a powerful aid to the government in enforcing their authority, and some were remarkably unscrupulous in their methods of gaining converts, taking young people away from their families and offering all sorts of material advantages to those who would change their religion. On the other hand, there were amongst them many good and cultured men and women who made friends with the people, gave them medical advice, and introduced many elements of good which have persisted ; they became the firm friends of the people and founded a number of remarkable educational institutions which have left an indelible mark upon the real culture of Ceylon.

The sixteenth, seventeenth and eighteenth centuries were fraught with immense difficulties for the Sinhalese. They could not put up fight against their more virile enemies from the colder north, and to sustain their existence they were forced to mean acts of trickery ; life, both for kings and people, became a game of cunning. The oppression of the Portuguese was worse than that of the Dutch, because it involved religion as well as administration and trade ; their chief aim was to win the island for the Catholic Church, and no stone was left unturned in this effort. Those who wander into the unfrequented by-ways of Ceylon will find witness of this in the many large Roman Catholic churches situated in remote spots and now almost abandoned. The Dutch were more purely traders, and many of them settled and mixed with the people, forming the active community now called Burghers, who have been a powerful influence in Ceylon, and who used the Dutch language until comparatively recent times. The British, in their turn, were also mainly traders, and were considerably less oppressive than their predecessors. The first Dutch governor took up duties in 1640, while British rule commenced in 1796. These centuries of unrest formed a great break in the economic development of the island and the people began to lose all interest in the improvement of their own country—an effect from which they have hardly yet recovered.

When once the British were established, they began to organise the country. Under the Portuguese and Dutch there had been so much fighting, plundering and unscrupulous exploitation of the inhabitants that little constructive work

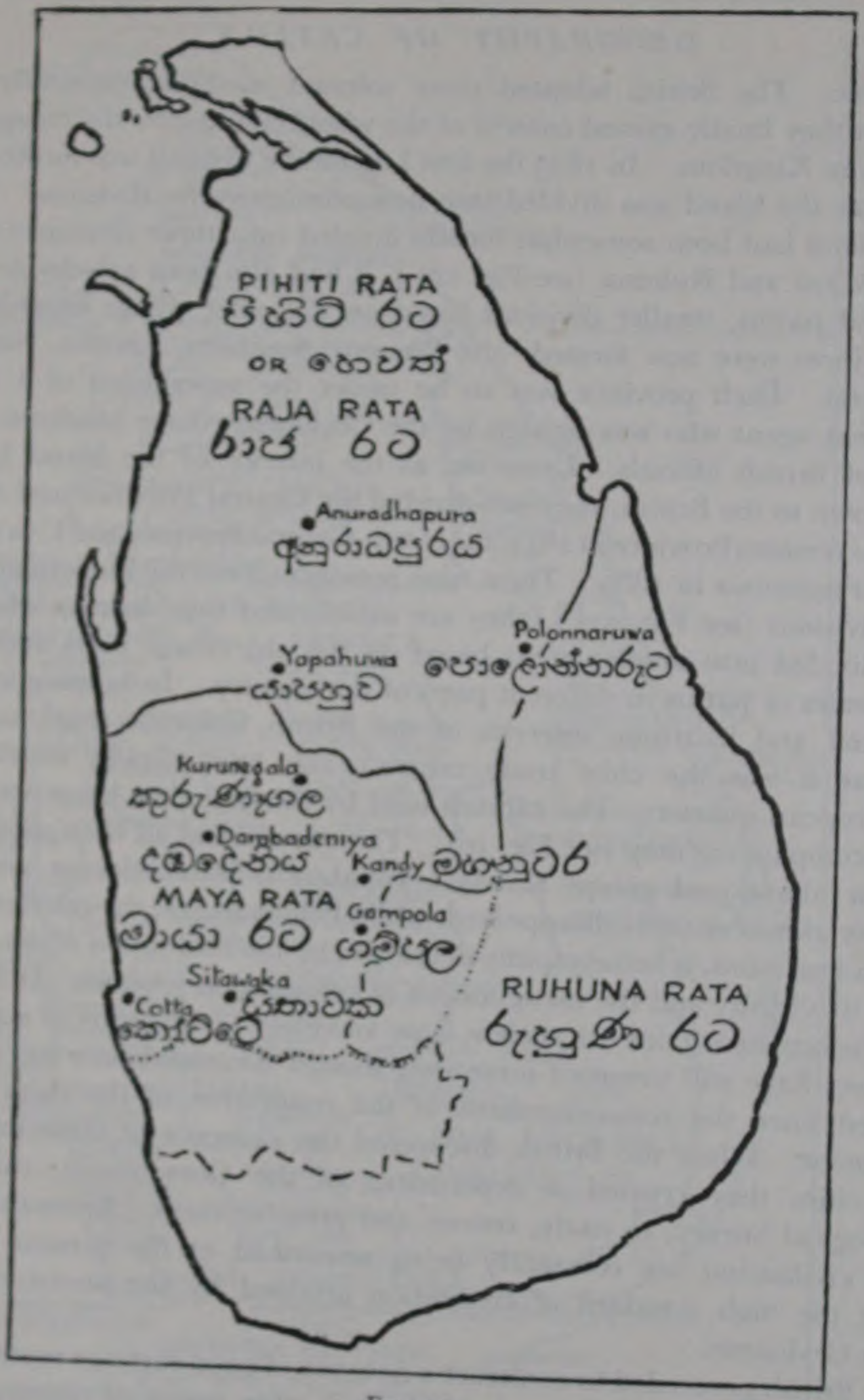


FIG. 10.

Ancient Provinces and Capitals.

..... Boundary of Maya according to Blaze's History.

– – – Boundary of Maya according to Codrington's History.

was possible. The British adopted more tolerant methods, especially after 1815 when they finally gained control of the whole country by the conquest of the Kandyan Kingdom. In 1833 the first Legislative Council was formed, and in that year the island was divided into new administrative divisions. Previously the land had been somewhat loosely divided into three provinces, Pihiti or Raja, Maya and Ruhuna (see Fig. 10); it had also been sub-divided into korales and pattus, smaller divisions based on the older village organisation. Five provinces were now formed—the Western, Southern, Eastern, Northern and Central. Each province was to be under the supervision of a British Government agent who was assisted by the Ceylonese village headmen and a number of British officials. Later on, as the interior of the island became better known to the British, they sub-divided the Central Province and created the North-Western Province in 1844, the North-Central Province and Uva in 1886 and Sabaragamuwa in 1889. These nine provinces form the modern administrative divisions (see Fig. 11); they are sub-divided into districts which are further divided into smaller areas based on the old village units and called either korales or pattus in different parts of the country. In keeping with the commercial and maritime interests of the British, Colombo was made the capital, as it was the chief trade centre; this town rapidly developed a large European quarter. The capitals used by the Sinhalese kings are shown in the accompanying map (see Fig. 10). These towns had all been successively ruined or abandoned except Kandy. Yapahuwa, Dambadeniya and Sitawaka have almost entirely disappeared, while Polonnaruwa, though famous for its stupendous ruins, is being rapidly developed by the restoration of the ancient tanks in its vicinity and the inauguration of colonisation schemes. It may not be long before she regains her ancient fame and glory as the centre of a granary. The others have still towns of some size, though Anuradhapura has only redeveloped since the commencement of the restoration of the ruins by the Government. When the British discovered the existence of these important ruined cities they created a department of the Government, called the Archeological Survey, to study, restore and preserve them. Remnants of the ancient civilisation are constantly being unearthed at the present day, all showing the high standard of civilisation attained by the ancestors of the modern Ceylonese.

The British proceeded to construct a network of good carriage roads all over the island, and later railways, telegraphs and other means of communication were developed. They are, as a nation, able financiers, and they proceeded to

FIG. 11.

Political Map of Ceylon, showing modern provinces, districts and chief towns.

create financial stability in the island, and attempted to restore the material prosperity of the inhabitants. The chief benefit which they conferred upon the island was settled peace and protection from other invaders. So long as the world continues to be run by warfare, an island situated in such an advantageous position for trade is sure to be coveted by the stronger nations. As the British had been the greatest naval and military power in the world for so long, no other nation dared to attack its possessions. So that during the last century of settled peace the economic development of the island has proceeded apace. The population has steadily increased throughout the period of British rule; it has more than doubled since the first census in 1871 and the increase has been remarkably rapid during the twentieth century. The exports and imports which in 1833 amounted to about $1\frac{1}{2}$ and $3\frac{3}{4}$ million rupees respectively now amount to over 500 million rupees annually.

The British constituted themselves as a separate "caste" and did not mix much with the inhabitants, though the personal relations between the races have been on the whole friendly. They were disinclined at the beginning to allow the conquered people to take much part in their own government and this was naturally a cause of complaint by the Ceylonese. This, together with a number of other factors, had the effect of making the people stand by and criticise all the actions of the Government instead of co-operating to improve their country. The early tendency was to spend excessively on military affairs, on British officials, and on advancing the interests of British planters; these have been natural causes of discontent which have been gradually disappearing as the British have gained experience of government in tropical countries. They have learnt much by the conspicuous success of the methods employed in Nigeria, a colony but lately developed and having the advantage of some very able administrators at the beginning. Full responsible government has now been granted, placing responsibility on the Ceylonese for their own welfare; this should have the effect of stimulating self-development and making the people co-operate in some of the schemes of regeneration essential to the island's welfare, such as the restoration of abandoned paddy land, and in the industrial and commercial development of the country.

PART I. CHAPTER 5

TRADE AND DEVELOPMENT IN THE MODERN ERA

The final phase in external trade development began with the completion of the Suez Canal in 1869. This had the effect of restoring the trade of the Middle East and concentrating the routes more upon Ceylon. Australia was developing its enormous export of raw material to feed the industries of Britain, so that Colombo assumed an unparalleled importance as the point of divergence of the routes to the Far East and to Australia. Ships became much larger ; Galle Harbour became useless for them, and owing to the impossibility of utilising the tideless silted estuaries of Ceylon, a large artificial harbour at Colombo was planned in 1871 and completed in 1885.

The first steamer had reached India via the Cape in 1825 ; it took 113 days to reach Calcutta, on only sixty-two of which was the vessel under steam. It was weighed down by an immense store of coal and often in danger of sinking ; whether it called at Colombo we do not know. By 1869, however, steamers had been considerably improved, and the discovery of anthracite, whose heating power per unit volume was greater, had simplified the coal problem. Coaling stations became a necessity to the British as the chief commercial nation, and this gave a double significance to the point of divergence of two routes crossing long stretches of sea. The possibilities of steamships brought about a new phase in trade, which was destined to have a most important influence upon the fortunes of Ceylon. Ancient trade was mainly confined to articles of luxury, of small bulk but high value, such as gems and spices ; it now became possible to carry large quantities of any one product with comparatively little risk. The bigger sailing vessels, like the famous " Tea Clippers," had latterly been able to carry sufficient tea, coffee, sugar and other commodities to give all classes in Europe a taste for them. The early British governors of Ceylon used their influence to stimulate the production of articles of trade which would sell in England. Various experiments were made, especially relating to the development of indigo, sugar and coffee ; the last met with greatest success.

The first coffee plantation was made in 1824, and by 1845 a " rush " for coffee land was in progress ; many English people with capital, as well as the wealthier Sinhalese, commenced a rapid clearing of the forest lands of the hill country for this purpose. The maximum crop was in 1882. A few years before this, " leaf disease " had made its appearance, and it gradually spread to such an extent that all the coffee plantations were ruined ; in a few years the production dwindled to nothing and numbers of the coffee plantations reverted to grass-land, in which condition they still remain, *e.g.* in the Kandy District. Cinchona, tea and rubber were all tried ; the first met with little success, while tea and rubber so rapidly accommodated themselves that they soon became the leading products, outstepping everything else. The tea and rubber output in recent years has been phenomenal, and has made the island intrinsically important and not merely a stepping-stone across the ocean. Internally this commercial prosperity caused an increase in the size of towns, especially ports and inland collecting bases for produce. The towns most affected by European activities are shown in the accompanying map.

The fascination of money making has drawn many workers away from the cultivation of essential food crops, notably, of course, rice. This staple food, an excess of which could easily be produced within the island, now forms one of the chief imports,—only one-third of the necessary amount being raised at home. This fact merits serious reflection on two considerations. The imported rice is usually husked and inferior in food value to the so-called " country rice," as used by the Ceylon farmers ; the injurious effects of the husked rice in producing the disease called beri-beri have become very serious in Malaya, where the same kind of thing has taken place. It is also generally agreed to be sounder for a country to make the maximum use of its own soil, especially for its own food supplies. At present only about one-fifth of the total area of Ceylon is cultivated. Temporarily, however, the profits of rubber and tea have benefited Ceylon in the same kind of way that England was eventually benefited by the industrial revolution. The surplus wealth thus created has made possible a great increase in the number of schools, as well as the large amount of educational travel which the wealthier section of the population has enjoyed during the last forty years. This has had the effect of raising the standard of living and hence caused increased interest in scientific agriculture.

The Government has already commenced to organise the restoration of the tanks, and in recent years a number of them have been restored, including some of the larger ones. People are not very ready to risk taking over the

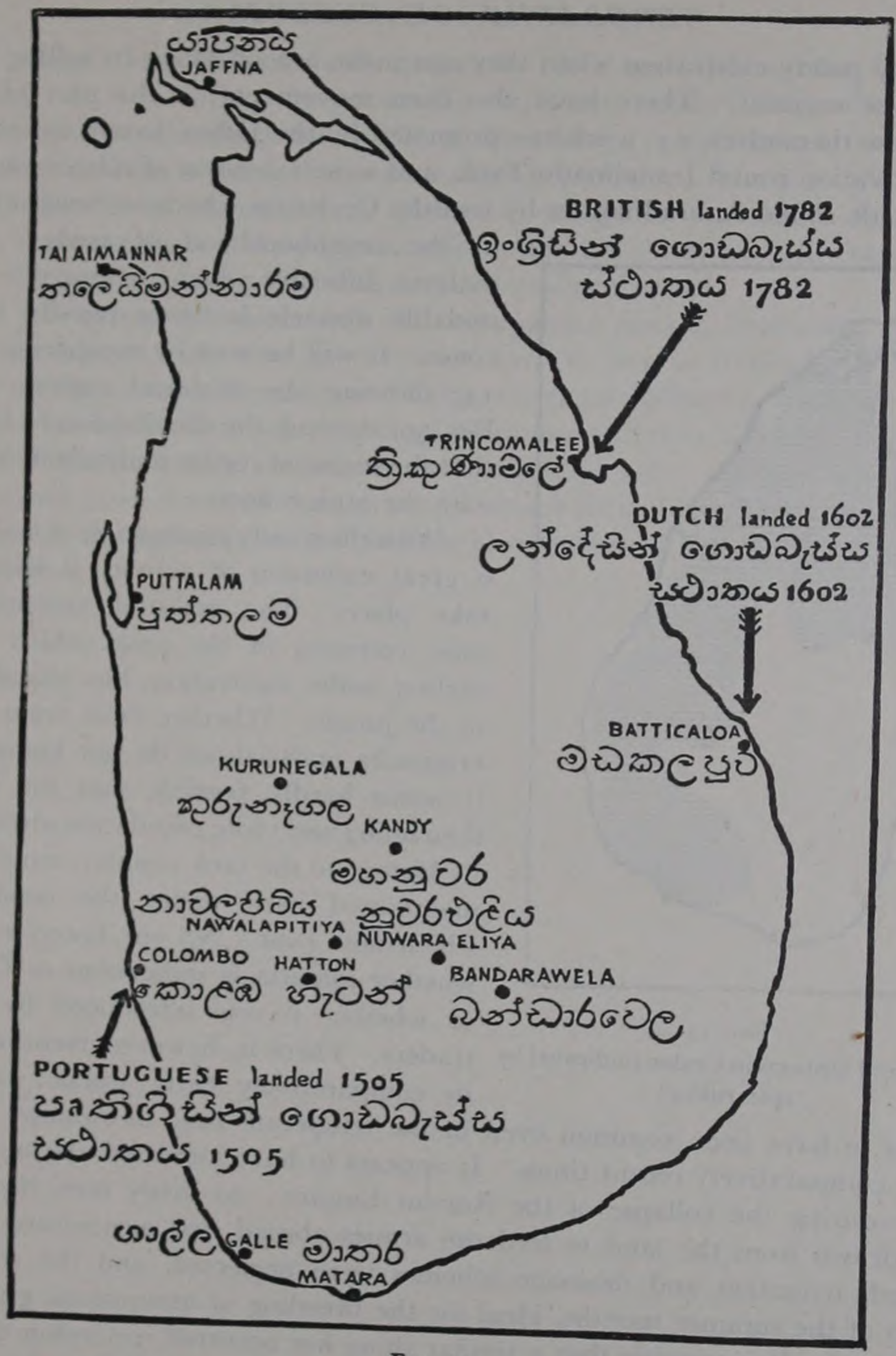


FIG. 12.
Towns developed or enlarged by Portuguese, Dutch and British.

necessary paddy cultivation when they can make a good living by selling tea, rubber or coconut. There have also been movements on the part of the Ceylonese themselves, *e.g.* a scheme promoted by the Jaffna Tamils to restore the cultivation round Iranaimadu Tank, and some extension of cultivation has been made round Anuradhapura by wealthy Ceylonese who have bought land in the neighbourhood of tanks. The malaria difficulty which presented a formidable obstacle is being rapidly overcome. It will be seen by comparing Fig. 13, showing the malarial region, with Fig. 59, showing the distribution of tanks, that the malarial region is almost identical with the tank country.

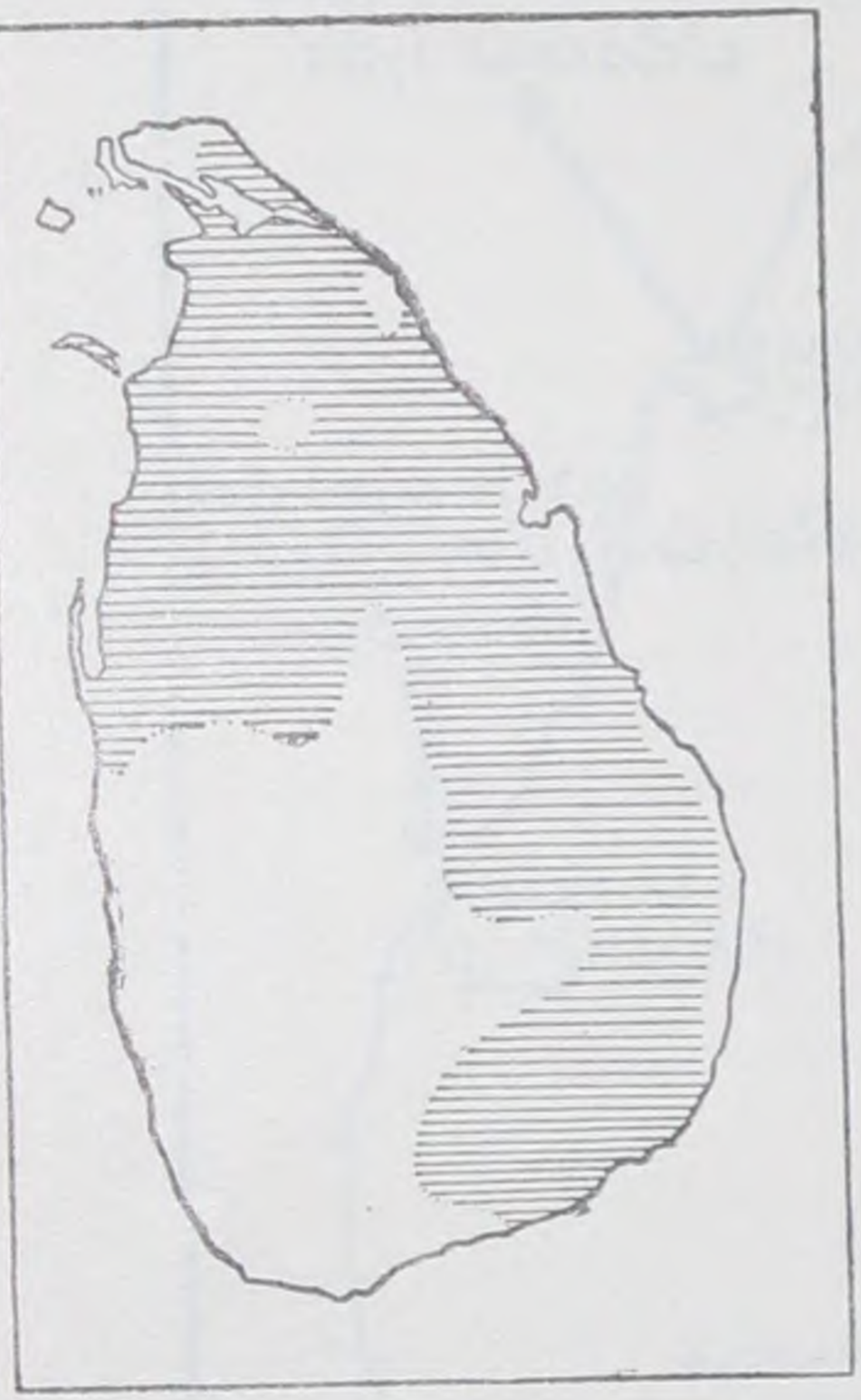


FIG. 13.
Malarial Districts in Ceylon [indicated by cross ruling].

With the steady eradication of malaria, a great extension of activity is likely to take place. The malarial mosquito is most common in the areas which were earliest under cultivation, but abandoned to the jungle. Whether these areas were originally malarial we do not know, but it seems hardly possible that the large, flourishing and virile population attributed by history to the tank country could have maintained itself under the conditions which now exist. No one knows exactly whether malaria is indigenous to Ceylon or whether it was introduced by early traders. There is, however, mention of it in comparatively early works; and it seems to have been common even in the temperate zone in swampy places until comparatively recent times. It appears to have increased alarmingly in Italy during the collapse of the Roman Empire; so many men had been withdrawn from the land to feed the armies abroad that agriculture deteriorated, irrigation and drainage schemes were neglected, and the stagnant pools of the summer months, ideal for the breeding of mosquitoes, gradually increased. It is possible that a similar thing has occurred in Ceylon through the wars and the abandonment of the old agricultural lands in the drier parts

of the island, and that malaria materially increased during the foreign invasions. It is said that the population had been steadily diminishing for several hundred years until the middle of last century ; and though there are no reliable statistics to prove this, it seems highly probable. Many people were killed during the wars, and many died of diseases ; it is probable that the debility due to malaria had a very bad effect upon the infant mortality rate and caused the people to succumb more readily to other diseases.

The prevention of malaria and of its companion disease, hookworm, forms one of the biggest tasks that governments have to face in tropical countries. That is the reason why Hospitals and Dispensaries providing free medicine and treatment have been established by the Government all over Ceylon. There is also an elaborate health service on the preventive side. Only when these diseases have been removed can the people attack their difficulties with energy and develop the agricultural and industrial resources of the country to their fullest extent.

PART I. CHAPTER 6

FURTHER EFFECTS OF THE EUROPEAN CONQUESTS

In spite of the proclamation which Queen Victoria issued to India in favour of freedom of thought, religious oppression continued in the early days of British rule, mainly because the conquerors sincerely believed that they were doing the people a great service by introducing a superior form of religion ; the persecution, however, practically disappeared. The result of this policy did not turn out in accordance with anticipations ; for the bulk of the people, who had no intention of changing their real views, merely acquired a habit of outwardly trying to please their conquerors and there was no sincerity in public life. This has continued until quite recent times to affect the economic life of the island, because the Government, which was not elected by popular vote, could not find out the real views of the people and hence could not always secure their co-operation. The Ceylonese became dependent and would not help themselves. As these difficulties have disappeared the progress has been remarkable. European influence on ideas was strongest in the lowlands, as they were longer occupied and the people were less conservative than their neighbours in the mountains. The Kandyans retained to a later date much more of their own culture ; they succeeded in retaining permanently their own system of laws, whereas the Roman-Dutch law dominated the lowlands. The Tamils, Muslims and people of Malabar who had settled in the lowlands succeeded in obtaining a few concessions to their religious observances, but the low country Sinhalese accepted the foreign code. The effects of the introduction of new ideas and new laws are very complex and many fall outside the range of a text-book of geography. History and geography, however, are so closely connected that these historical facts should lie in the background of any study of the human and economic geography of the island. Europeans passed through a long phase of desire for domination of other peoples which has gradually tempered down with the lapse of time. In the initial stages it took the form of the harshness and cruelty of the Spanish Inquisition, which exterminated all the people in

South America who would not conform to its rules. This destructive policy could not last long, and it later gave way to more civilised tactics. The great colonising nations eventually developed a method of " peaceful penetration " which involved the organisation of trade and educational, medical and other services of direct benefit to the conquered people ; this was a much more effective way of spreading ideas. In more recent times the European nations have learnt to appreciate the contribution to world culture which has been made by the smaller nations. A fuller knowledge has made them see that enforced uniformity is not likely to unify the world. The League of Nations which was largely organised by European peoples, worked for world peace by safe-guarding the interests of the weaker nations, and demonstrated how unity could exist in the world in spite of diversity if people definitely wished to be friendly. A new world organisation, the United Nations Organisation (U.N.O.), has replaced the League of Nations and is carrying on the good work started by the League. Every effort is being made to improve the lot of the smaller peoples.

The early impress of European culture had a number of important effects upon everyday life in Ceylon which call for comment. They extend to almost every branch of life, including religion, education, family life, language, art and medicine.

As it was good policy to agree with the conquerors, those who hoped for advancement under the Dutch or Portuguese were obliged to pretend to be Christians ; no government posts, however unimportant, would be given to members of the " heathen " religions. The people accordingly went to the churches to go through the ceremony of baptism and admission into the Christian church, without the least idea of changing their real convictions. This baptism involved the adoption of a new " Christian " name which was more convenient for the foreign officials than the lengthy Sinhalese or Tamil names : thus arose the custom of using Portuguese, Dutch and English names, which has persisted to the present day. It was not necessary under the English rule, but people hoped to please the conquerors. Whole villages adopted the Portuguese names of de Silva [Dutch variant de Zilwa], Perera, Fernando or Peiris, and as these have been passed on to an increasing number of descendants the result is very confusing. People of English education gave their children names which they gleaned from the literary classics studied at school. Lately many of the most important families have reverted to Sinhalese names, either by a complete change of all names or by slow stages, *e.g.* when John de Silva adds an Indian

name and calls himself " John de Silva Wickramasinghe " and his children are given Indian first names such as Chandra, Sita or Tissa.

The actual **influence** of the **Christian religion** is difficult to estimate ; in later years it has made little headway, though it has probably had many indirect influences on ideas, especially as so many of the leading people of Ceylon have been educated in Christian institutions.

Possibly the most important influence exerted by the Christian missionaries was in the sphere of **education**. During the disruption following on the various invasions the old temple schools had fallen into decay and the people were glad to patronise the schools provided by the Christian missionaries. The education provided, however, was of European type and in the early days the scholars were taught to imitate everything European and adopt the dress, habits and language as well as the religion of the conquerors. Some of the most important schools were founded by the British, and provided instruction in the history, literature, geography, botany, etc. of England without including any study of Ceylon. English was the language of the schools and the languages of Ceylon received no attention. The education was thus completely divorced from home life and had very little influence on it. Children became alienated from their parents, often forgot their own language, and were unable to converse with the older generation. They regarded education as a purely intellectual affair and did not think of using it in their everyday life. This type of education did not serve to raise the standard of home life and tended rather to cripple progress. It produced a large number of highly-trained intellectuals whose interests were outside their own country. Those who studied botany, for example, knew English botany books by heart but knew nothing about the plants of their own land and were of no use to the Ceylon Forestry Department or other similar institutions. Furthermore, they despised the traditional work and methods of their fathers. In recent years many changes have been made in education, including the introduction of the study of the languages, history and geography of Ceylon, and these have resulted in an immense amount of progress within a very short period. The introduction of compulsory education and the provision of elementary vernacular schools and Central schools of a national type has very greatly altered the condition of the people throughout the island. Students who go to English universities are now being encouraged to do research work on subjects relating to their own country, and the " trousered gent," as he is popularly known, with his unintelligent imitation of the habits as well as the vices of the European, is gradually becoming less conspicuous.

The educational system, as it now stands, is, however, modelled on the English pattern and owes a great deal to English ideas. The domination of English ideas in Ceylonese education is comparable with the part played by Italian in English education after the Revival of Learning in Europe. The absorption of a foreign culture may be good in the long run, but the transitional period is often a difficult one.

Within the home the use of certain **European domestic articles** has become widespread, particularly amongst the wealthier classes. The most conspicuous, perhaps, is the use of spoons, knives, forks, cups and saucers, plates, etc. of European design, imported by British traders. The imitators of Europeans gave up the ancient custom of eating rice and curry with the fingers of the right hand in favour of the European spoon and fork. It is, of course, a more convenient way of eating in large institutions like schools, where it is not practicable to use finger bowls, though the curry cannot be so well mixed with the rice. Beds of European design are now replacing the traditional mat and pillow of the Sinhalese household. But many of these things are only employed in the houses of the rich ; the latter will also use electric fans and punkahs and other luxuries regarded as necessities by Europeans.

European **dress**, which came to be regarded as a natural accompaniment of civilised Christians, was for a long time adopted by the Sinhalese, especially the upper classes, who hoped to occupy posts in the Civil Service. It is still preferred in the Law Courts and in some of the Government services, including railways and police. In the intimacy of the home, under the freer modern conditions, these people are now using their more comfortable national dress. At one time the dress of Europeans was totally unsuited to the climate of Ceylon, particularly the fashions prevailing amongst women ; but now that it has become more adaptable and hygienic, there seems to be little objection to its use. For certain purposes European styles are more convenient—*e.g.* the use of trousers instead of the sarong by men for certain types of work and for sports. It is quite difficult to decide what elements of dress in Ceylon are really Sinhalese, so much has it become modified by the styles of other nations. The one national garment seems to be the " cloth " both for men and women. The white bodice now worn by women seems to be Portuguese in origin, while in the varieties of coats, shirts and other garments affected by men we see reflected many features of Dutch, Portuguese or British styles. A full skirt replacing the women's cloth, introduced by the

Dutch, still lingers amongst the older generation, while the saree, which is an Indian style, has become the more formal outdoor dress of women. On the whole, women's dress has naturally remained the more conservative and has witnessed fewer changes. The English bridal veil has become common, while shoes imported from Europe are worn instead of sandals by an increasing proportion of the population. The spread of knowledge on the subject of hookworm is responsible for a decrease in the number of people walking barefoot, as it has been discovered that the infection often enters through wounds in the foot. Stockings, which are more or less useless articles in a hot climate, have also enjoyed a long vogue amongst the rich.

Language has been greatly affected. The most fundamental influence of foreign contact must have been operative at quite an early date ; to facilitate intercourse with foreigners the Sinhalese dropped all the inflexions for case, tense, etc. in their everyday spoken language. At present, therefore, colloquial and literary Sinhalese differ very considerably. There are, however, a large number of new words which have found their way into the language through the various European invaders. These include Portuguese, Dutch and English names for various articles they introduced, as well as a large number of technical terms connected with modern inventions like motor cars, trains, wireless telegraphy, shipping, and general scientific terms. Foreign words can easily be transliterated into Sinhalese, as it is a strictly phonetic language, having a large range of sounds ; it only lacks the sound of the letter " F " of the Roman alphabet . [This is the alphabet used by the English and a number of other European nations and was originally used by the Romans.] Some examples of these adoptions are the Dutch word " artapal " for " potato," the Portuguese " pan " for " bread," or the English " relwa " for " railway."

The English now in use by the Ceylonese is also much modified and has some curious foreign innovations such as the French word " boutique " for a small shop, the Dutch " almirah " for a cupboard. It must not be supposed, however, that all the words in Sinhalese which are similar to English have been adopted. A great many fundamental words, such as " water," are alike, because both languages contain a certain number of words derived from Sanskrit.

English has now become the chief medium of exchange between the different races throughout the Indian area, and through its abundant literature has greatly influenced nearly all branches of thought.

The English system of medicine has tended to replace the ancient Ayurvedic system. The first tendency was to abandon the latter system entirely, even

though it had been so long in use and had the confidence of the uneducated classes. This was largely because the government encouraged people to study medicine in England, where the Ayurvedic system was almost unknown ; but also because the Ayurvedic practitioners were unorganised and followed a somewhat mechanical method which did not appeal to the highly educated classes.

FIG. 14.

Ratnapura Katchcheri, etc. An illustration of the beauty of Sinhalese architectural design.

The general tendency, however, during last century was to neglect all forms of native culture, including art, architecture, language, literature and medicine, and study only the foreign forms. Lately many of the doctors with English qualifications have been investigating the Ayurvedic system. Like all systems it contains elements of value, and no source of knowledge should be neglected in furthering the interests of human welfare.

Sinhalese **architecture and art** almost died out during the seventeenth,

eighteenth and nineteenth centuries. The Dutch had probably the most important influence on domestic architecture, as they introduced the same type of bungalow with portico and central courtyard as they took to South Africa. They left a number of interesting buildings in the towns which were their headquarters, including some fine stone houses and fortifications at Galle and Jaffna. The English have also erected many large buildings of their own design, and very few buildings of Sinhalese design have been constructed within recent years. There is, however, a recent movement in favour of the revival of Sinhalese art which is likely to have an important influence on developments in the near future.

The historical geography of Ceylon is of special interest because amongst all the Asiatic countries it has had the most contact with European nations. It has always been supposed that the so-called " Eastern " and " Western " civilisations were quite incompatible. Rudyard Kipling, an English poet, has expressed it by saying :

" For East is East and West is West,
And never the twain shall meet."

In this small island, however, they have met, and the contact has, at any rate, at length proved to the representatives of each form of culture that they have much to learn from each other. The future development of Ceylon from the human and economic point of view will be of special interest. If the contact of the nations represented in the island results in nothing but commercial and political rivalry, it will be of little permanent value. If, however, the best elements of both cultures become fused, there is every possibility that Ceylon will resume the important part that it played in ancient Asiatic history.

PART II

PHYSICAL GEOGRAPHY

PART II. CHAPTER 1

THE SEAS AND COASTS AROUND CEYLON

During recent years the Government Marine Biological Department has collected a considerable amount of information relating to tides, currents and other conditions in the seas, in connection with its study of fisheries. The Admiralty, a department of the British home government, has also organised some general studies of the Indian waters. The publications of these Departments form, therefore, the chief source of information on Ceylonese waters.

Ceylon is a detached portion of the mainland of India and stands upon a small **continental shelf** which ends abruptly in the south and east, from five to twenty-five miles from the coast; at this point there is a sudden drop in the space of about twelve miles from 200 to about 6000 ft. or more to the general level of the Indian Ocean. This continental shelf has two elevated portions in the north and north-west, which nearly form land connections with the mainland. The first of these, known as Adam's Bridge, is a narrow ridge which has only about twenty-two miles covered by shallow sea, from which a number of small islands project. One of these islands, called Krusadai, immediately south of Kutikal Point in Pamban Island, forms a very useful observing station for scientific work. The water covering Adam's Bridge is too shallow to take boats of any size, so that vessels sailing from Colombo to Madras must take the longer route round the east side of the island. A train ferry joins the Indian railway terminus at Dhanushkodi with the Ceylon terminus at Talaimannar, situated on Mannar Island, a part of the ridge which is separated from the mainland by a channel so narrow that a road and railway have been taken across it by bridges. The construction of this route caused the growth of the town of Mannar, which is situated where the road and railway enter the island. This town has developed at the expense of Mantai on the mainland, the modern

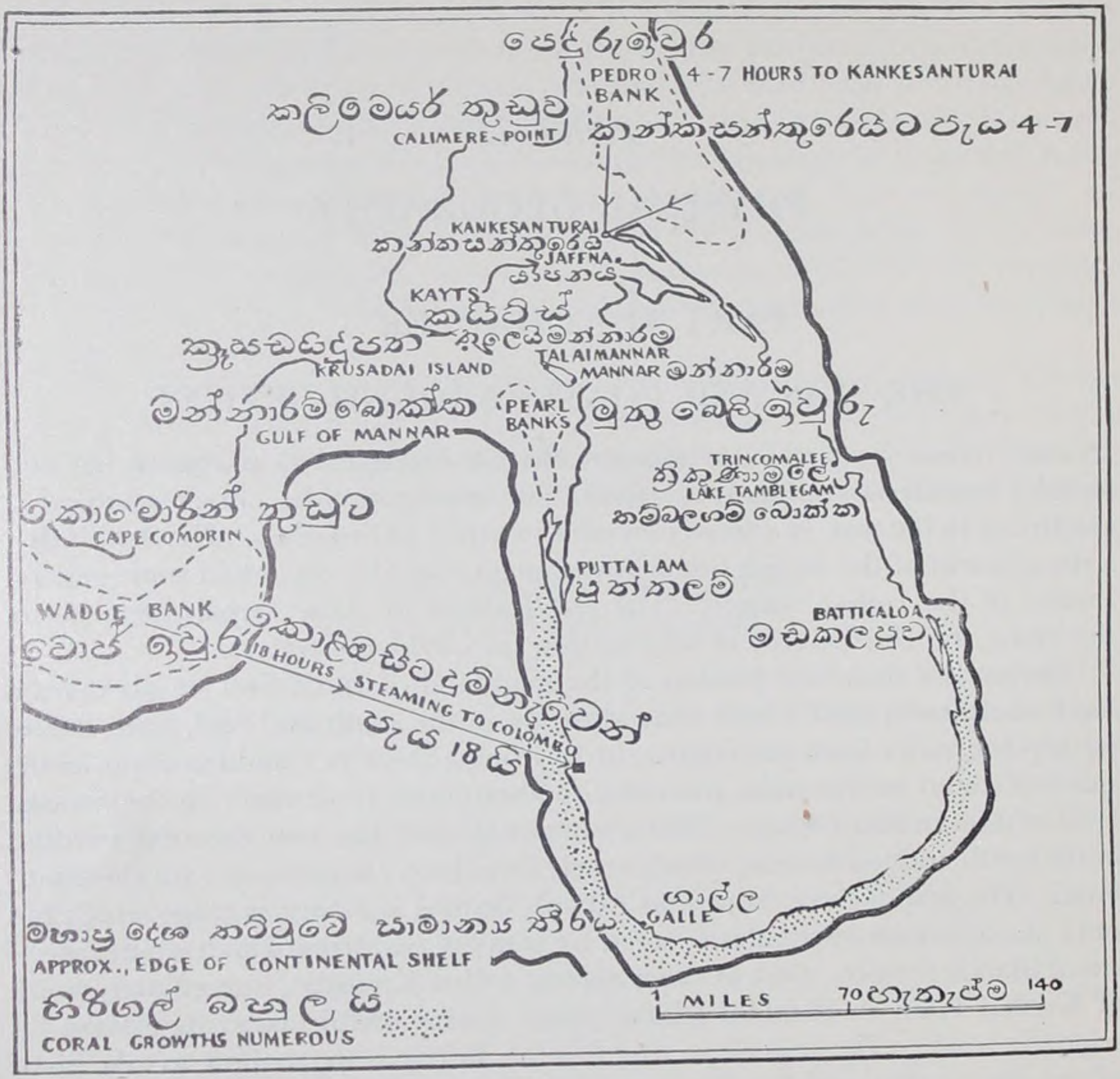


FIG. 15.

Ceylon as a part of India. The continental shelf widens considerably northwards along the Indian coast. Position of coral growths, Pedro, Wadge and Pearl Banks as in Report of Govt. Marine Biologist. Owing to small size of map the width of the coral growths is exaggerated.

representative of the ancient landing-place called Mantota. The famous pearl banks or paars situated just between Mannar Island and Kudremalai Point are also elevated portions of the continental shelf adjoining this ridge.

The other elevated area is much lower and completely submerged; it stretches from the north-east of the Jaffna Peninsula towards Point Calimere in India, the highest part being known as the Pedro Bank. The sea lying between these two ridges, all of which is very shallow, is known as Palk Strait. South of Adam's Bridge the sea deepens rapidly in the Gulf of Mannar, nine-tenths of which is over a mile deep. West of the gulf is another elevated area known as the Wadge Bank, which forms an extension of the Indian mainland. The rest of the continental shelf is described by Mr. A. H. Malpas (*Biological Survey of the Littoral Waters of Ceylon*) as follows: It is "a narrow ledge, ten to twenty miles in width, ending abruptly at the so-called 100-fathom line as a more or less precipitous submarine cliff, dropping some hundreds of fathoms. The general character of this shelf is rocky, with varying growths of corals, sea fans and sponges, of many sizes, shapes and colours. This growth is in places so thick as to form a diminutive submarine forest, the happy hunting ground of bottom-feeding fishes of all kinds." The southern portion between Batticaloa and Colombo is particularly rugged, with rough coral growth and jagged points of rock; two of these points projecting above the sea surface near the mouth of the Menik Ganga form the rocks called in English Great and Little Basses,

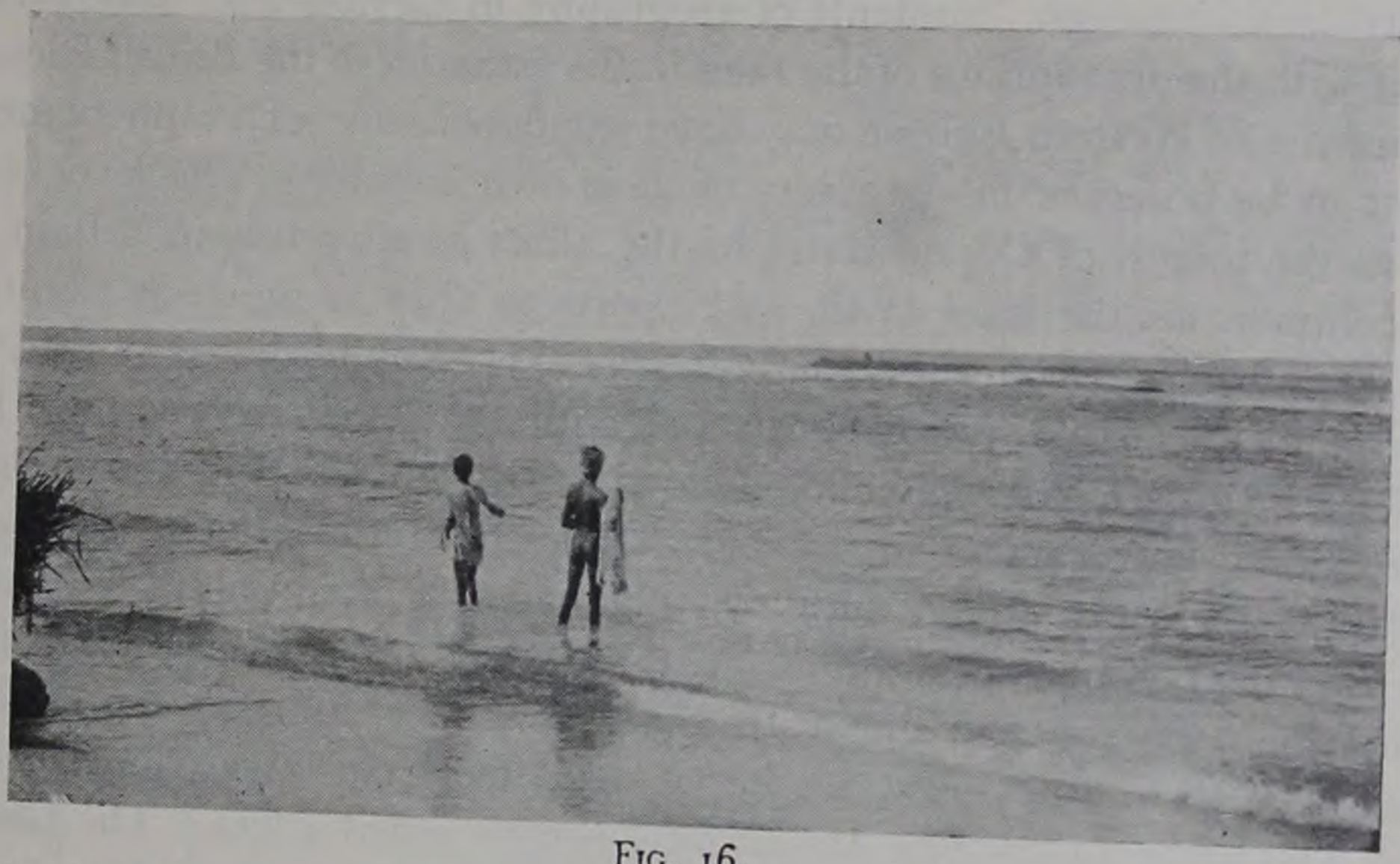


FIG. 16.

The line of curling waves in the background shows the position of the coral reef near Hikkaduwa. It just reaches the surface of the water. Many small fish live between the reef and the shore. The boys are watching for fish, which they catch with the small net.

but more picturesquely in Sinhalese Great and Little Ravana's Rocks. The shelf is broken in three places, where the hundred fathom line comes very close to the coast (*a*) at Trincomalee, (*b*) near Batticaloa, (*c*) at Panadure.

It is because of the exceptionally deep sea round over two-thirds of the coasts that Ceylon is almost unaffected by tides. The ordinary tidal wave of the open ocean never exceeds more than about three or four feet. The highest tides are experienced in the estuaries of rivers on the largest continental shelves, on to which the water is carried from the open ocean and heaped up most in the narrowest openings. Students of geography in Ceylon who have become familiar with the descriptions of the tides in the estuaries of the British Isles and the countries of Western Europe may have wondered why such a phenomenon was not to be observed in the rivers of their own country. The level of the water at the mouth of Ceylon rivers hardly alters at all, while in Britain it is quite common for the level at the river ports to alter as much as twenty or thirty feet during the course of twenty-four hours. Round the coast of Ceylon the rise and fall of the tide is hardly perceptible. Tidal records have been kept for a long period at Colombo, Galle and Trincomalee, and are published by the Indian Government in the Tide Tables for Indian Ports. Along the southern shores of the island the daily tidal range is often only a few inches, while the range of high spring tides (*i.e.* those which occur twice in each lunar month, when the sun and moon are acting together, and are therefore the highest of all) is only 2·6 feet, 2·3 feet and 2·1 feet respectively for the three ports. The highest tides ever known have not exceeded 4 feet. The Ganges, in contrast, has tides of about 14 feet, and rises sometimes as much as 20 feet. Ceylon therefore has practically oceanic conditions round the greater part of its coasts, and its harbours present a remarkable contrast to those of Britain. Tidal waves entering the mouths of rivers are a great help to shipping, because they scour out the openings and prevent the deposition of material brought down by the rivers at the point where their current is checked by the sea water. In the absence of high tides not a single important river of Ceylon has a navigable mouth ; they are all blocked by sand bars or banks of mud behind which the water spreads out over the land, forming large, shallow, coastal lagoons (see Fig. 118). The Mahaweli Ganga, Ceylon's biggest river, is not much smaller than the Thames, and yet it is quite useless for navigation, except for very small boats on certain sections. The only use of the coastal lagoons is for fishing purposes, except where they have been linked up by canals to take paddy traffic, *e.g.* from Colombo to Puttalam. Landing-places for fishing boats are

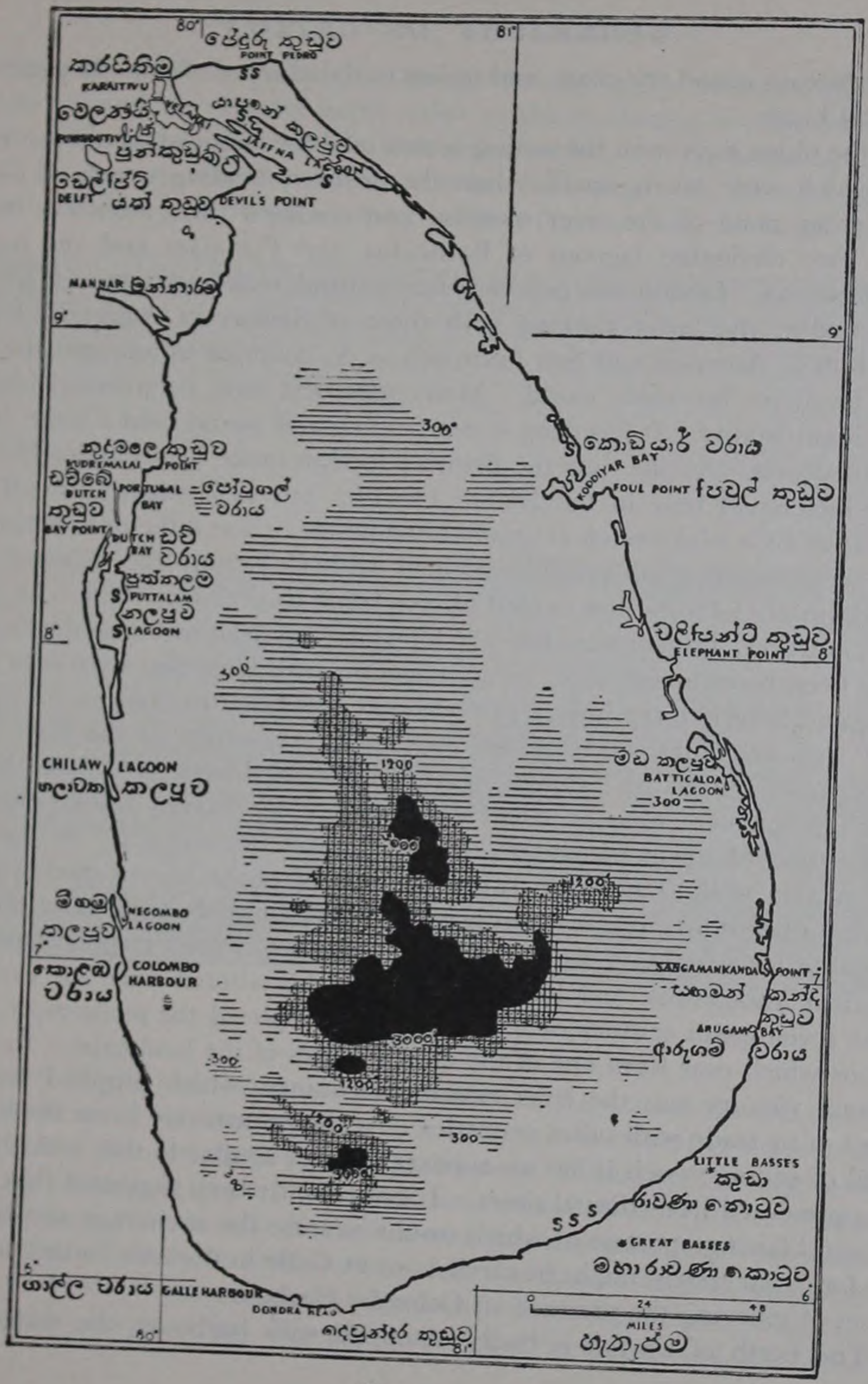


FIG. 17.

Names of Coastal Features and Rough Relief Map. S = saltern.

very numerous round the coast, and owing to the absence of tides they are safer for small boats.

In the olden days even the sailing vessels used for long-distance ocean transport, which were much smaller than the ordinary trading vessels of to-day, could enter none of the river mouths, and confined their attention mainly to the two navigable lagoons of Batticaloa and Puttalam and the natural rock harbours. Ceylon has two very fine natural rock **harbours** at Galle and Trincomalee, the latter ranking with those of Sydney in Australia, Rio de Janeiro in S. America and San Francisco in N. America as amongst the most magnificent in the whole world. Many travellers have commented upon its exceptional beauty. It has deep water landing and would hold a large fleet of modern vessels. At one time the British hoped to make Trincomalee Harbour their chief naval base in the Indian Ocean ; but as it was so cut off from civilisation by a wild stretch of uninhabited jungle, it was difficult to maintain a town there which could possibly compete with Colombo—the richness of the hinterland of Colombo has caused all the trade to gravitate there. In recent years, however, Trincomalee has developed a good deal, owing to the fact that it has been brought into easy communication with Colombo by motor omnibuses, and latterly by railway ; so that it has now been revived as a naval base, fitted with oil tanks, and has become the headquarters of the East Indies Squadron of the British Empire. Galle Harbour, though very much smaller than Trincomalee, was the chief landing-place for foreign boats before the introduction of steam navigation, because it was more directly on the route from Arabia to the Far East. It is a classic type of the havens used by sailing vessels—a beautiful circular opening with a narrow mouth, deep water, and now navigable for vessels up to 10,000 tons. The town and harbour have long historical associations and have not considerably altered since the early half of the seventeenth century, when the Dutch completed the picturesque fortifications which now form one of the chief features of the landscape. In its immediate vicinity was the chief cinnamon country, which supplied the main object of its trade with other countries. At the present day when the harbour is full of sailing vessels it has an appearance very similar to that which it must have presented in mediæval times. It has recently been suggested that dredging and blasting operations, which would increase the anchorage accommodation for cargo vessels, might be carried out at Galle in the near future, with the object of relieving the pressure on Colombo Harbour.

The north of Ceylon is badly equipped with harbours, the water being

shallow, the coast line somewhat straight owing to the structure of the coral limestone, and the extreme north liable to storms during the north-east monsoon. Efforts have been made to build a harbour at Kankesanturai, where small steamers now anchor within a mile of the coast, but the harbour works have been destroyed during storms ; so that at present all the larger schooners

[Copyright, Plate Ltd., Colombo.

FIG. 18.

Colombo Harbour.

which are unable to reach Kayts anchor outside Kankesanturai and discharge their cargo on to smaller vessels, which convey it to the storehouses on shore. No vessels of any size can approach Jaffna and Kayts, on the neighbouring island of Velanai, is its port. A large enclosed stretch of water is created by the islands of Velanai and Karaitivu and the mainland, and entered by a narrow channel between the islands ; only the small sailing vessels, however, can enter here. Steamers cannot approach Jaffna within fourteen miles.

Colombo Harbour (see Fig. 18) is almost entirely artificial, and has been

constructed at great expense round a slight niche in the coast line. Its position was not so much determined by the advantages which it possesses from the point of view of shipping as by its strategic position. The Portuguese, who first developed it, wished to have a fort near the middle of the west coast, from which they could attack the seat of the Sinhalese kings at Kotte and command the inland routes. The adjacent mouth of the Kelani Ganga is useless on account of the moving sand banks and coral growths by which it is blocked (see Fig. 115). The present harbour, which was started in 1873 and completed in its present state in 1912, has an area of 643 acres and will take a large number of ships, though so great is the traffic that it will hardly accommodate the constant stream of boats which seek admittance. As there are no appreciable tides the water level remains practically constant, and boats can enter at all times without the delay experienced at some ports, of awaiting high water. The great disadvantage of Colombo Harbour is that it has no deep landing along the quays, and hence all goods and passengers have to be conveyed to and from the boats in small craft, thus adding considerably to the cost of transport. But plans are afoot for modernising the port of Colombo by providing deep landing quays and other modern facilities.

For facts relating to the **currents of the Indian Ocean** the student should consult a text-book of general geography before reading the following remarks, which apply specially to Ceylon. It will be recalled that north of the Equator in the Indian Ocean the currents reverse their direction every six months, with the change of monsoon ; so that there is, in the seas round Ceylon, a tendency for the water to move from south-west to north-east during the period March to September, and in the opposite direction from September to March. The direction of the currents near Ceylon is shown in the accompanying diagrams, which illustrate the conditions during the middle part of each monsoon period. It will be seen that Ceylon, as it projects further south than India, causes a considerable deflection of the currents. The continental shelf between Adam's Bridge and the Pedro Bank breaks the continuity of the circulation between the Gulf of Mannar and the Bay of Bengal. The water which is driven up the Gulf of Mannar during the south-west monsoon turns back along the coast in the opposite direction, working its way gradually round the southern end of the island. The strong drift of water from the south-west is probably responsible for the vigorous coastal erosion, which is more marked in that portion which immediately faces the south-west monsoon than anywhere else in the island. During the north-east monsoon, which, however, is a much

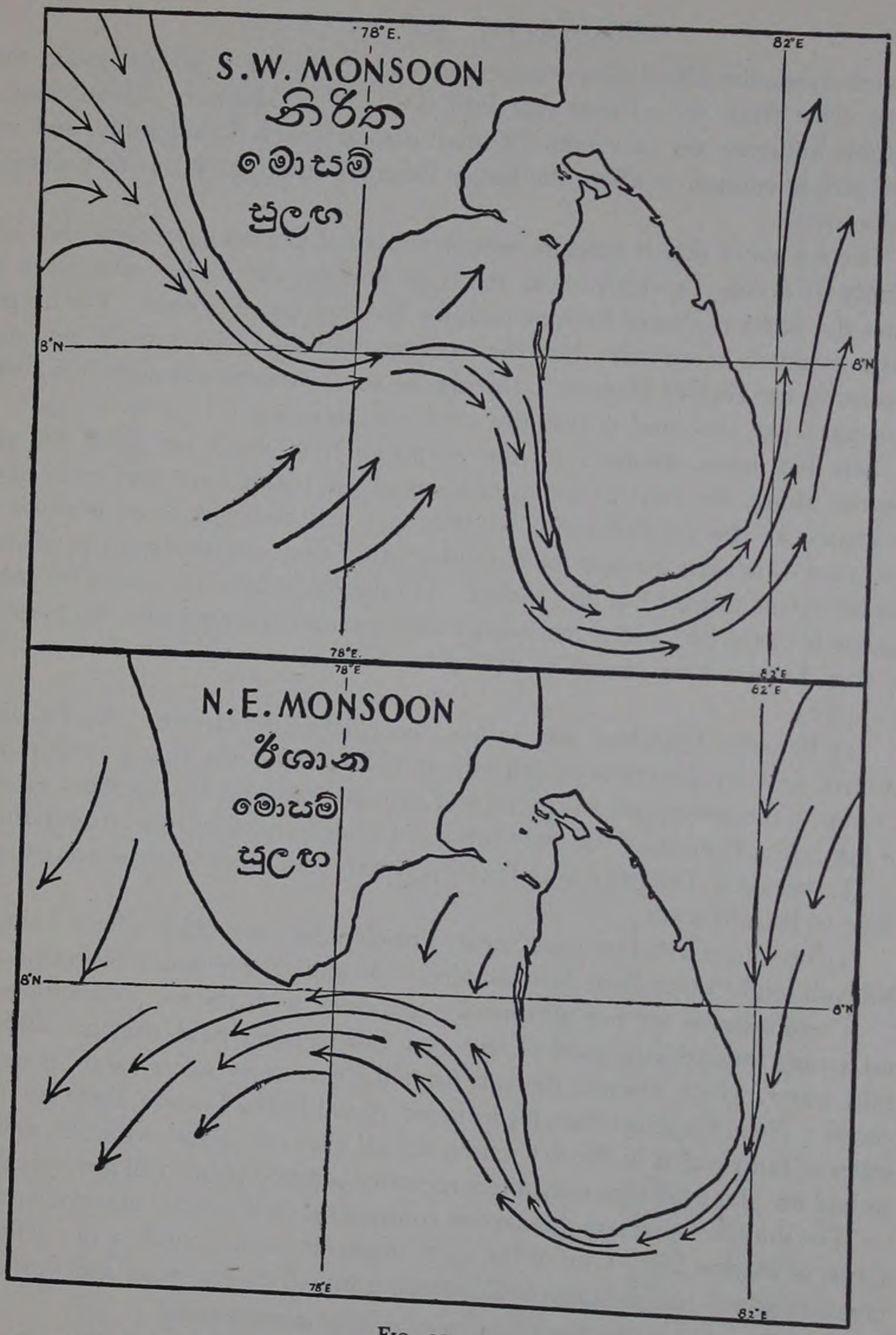


FIG. 19.

Rough Sketches of the course of Ocean Currents near Ceylon during the middle of each monsoon season [after Dr. Pearson].

weaker wind, the circulation is reversed, and the water is pushed round the south coast from the eastern side into the Gulf of Mannar. These coastal currents influence the movement of small coastal vessels considerably, and are often strong enough to affect the larger steamers entering or leaving Colombo Harbour.

The sea water that is actually near the coasts of Ceylon has a somewhat low salinity as a rule, especially near the river mouths after heavy rain, when at times the water is almost fresh enough for the washing of clothes. The deeper water is much more salty but the average salinity varies greatly with the seasons in the Gulf of Mannar. During the south-western monsoon it is about 35·5 parts per 1000 and during the north-east monsoon it is as low as 33.

Salt has been obtained by the evaporation of sea water from the salt lagoons along the coast in the drier parts of the island since very early days. A glance at the rainfall map (see Fig. 43) will show us those portions of the coast which are the best for obtaining salt ; they are the dry strips of coast cut off by the isohyet [1] of fifty inches. On the east side of the island the coasts having between fifty and seventy-five inches are also fairly good for this purpose, as they have a long season of drought. The salterns are therefore in three groups :

(*a*) Between Puttalam and Jaffna, the chief of which are : the Puttalam salterns and the government salterns at Palavi along the shores of Puttalam Lagoon ; the government salterns at Elephant Pass and the northern salterns of the Jaffna Peninsula, the chief being at Chiviyateru (four miles from Jaffna) ;

(*b*) between Tangalla and Pottuvil, where the chief salterns are situated close to Hambantota ;

(*c*) on the north-east coast near Trincomalee, the chief saltern being at Nilaveli, eight miles from Trincomalee. (*b*) and (*c*) are under government.

These salterns are not all directly connected with the sea ; sometimes the sea enters them during part of the year but in other cases they are filled by rain water, which absorbs the salt from the extremely saline sands along the coasts. Near Elephant Pass, for instance, round Jaffna Lagoon, there are many miles of sand which in the dry season are all glistening white with salt, and are so bad for plant life that only a few specially adapted plants will grow on them.

The shallow waters on the narrow continental shelf contain many interesting forms of marine life. One of the most important is the coral, a tiny jelly-like creature which has the power of extracting lime from sea water and forming it

[1] Isohyet = line joining places of equal average rainfall.

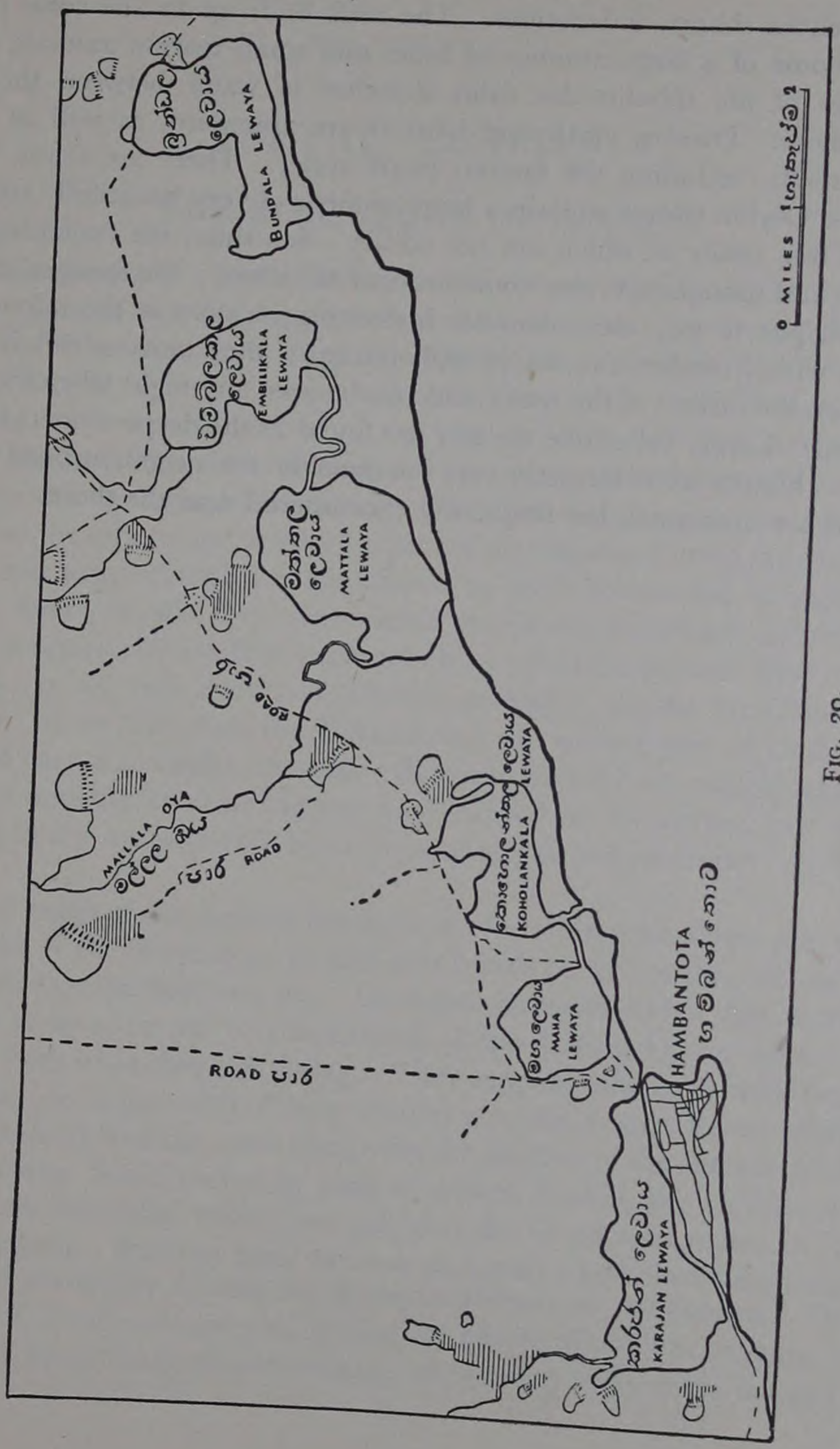


FIG. 20.

The Salterns or Lewayas at Hambantota.

into marvellous shapes and designs. The reefs built up by the coral polyps form the home of a large number of fishes and small marine animals, while other types of life inhabit the calm stretches of water between the reefs and the shore. Prawns, crabs and lobsters are abundant, as well as many kinds of shells, including the famous pearl oyster. There are many edible fishes ; the Ceylon waters contain a large number of very beautifully coloured species of fish, many of which are not edible. Sea slugs, sea cucumbers, sea anemones and sponges are very common near the shore ; the sponges are not, at present, put to any use. Another interesting creature is the microscopic noctiluca which renders the sea phosphorescent ; they move about in large numbers on the surface of the water and can be seen any night when the moon is obscured. Larger fishes like the seer are found in the deeper waters beyond the reefs. Sharks were formerly very common in the neighbourhood of the island but are now much less frequently encountered near the shore.

PART II. CHAPTER 2

THE STRUCTURE OF CEYLON

CEYLON is essentially a part of India—not of the whole of India, but of its vast southern plateau, the Dekkan, which projects from the Asiatic mainland and was probably once separate from it. This plateau, the bulk of which is composed of ancient crystalline rocks, is probably one of the oldest land surfaces in the world. "It constitutes one of the 'stable blocks' of the earth's surface, having remained resistant to folding and very little altered since the early days of the earth's geological history. In that very distant past, the rocks then present on the surface and, it may be, part of the original crust of the earth, were twisted and torn, crumpled and puckered by earth movements and igneous or volcanic forces, so that they were altered out of all recognition and converted into the complex of crystalline rocks which we see at the present time. All this took place in the very early period which geologists call the Pre-Cambrian or Archean. Since that time the Dekkan and the central part of Ceylon have remained part of a continental mass. Seas and oceans have sometimes covered the edges and big lakes or lagoons have existed on its surface, but we may conclude that it has probably never been wholly below sea level." [Dr. L. D. Stamp.]

To the north of this ancient block, in the Indo-Gangetic Plain, and even in the heights of the Himalayas, we find many beds of rock which can only have been formed on the floor of a sea. Geologists have concluded that at one time the land surfaces in the neighbourhood of the Indian Ocean were entirely different from what they are to-day. They suppose that there were two large continents, one in the north of Asia, centred near the Angara River, which they call Angaraland, and the other occupying the position of the Indian Ocean and its surrounding lands, including most of Africa, Arabia, the Dekkan, Ceylon and Western Australia, which they call after the Gondwana region in India—Gondwanaland. Between these two was an ocean whose floor became greatly folded and eventually formed the immense Himalayan mountains. The vast continent of Gondwanaland was, during the course of millions of years, gradually broken up by cracking and drifting, the wearing away of the sea and other

agents of denudation, so that but fragments of it now remain. Ceylon was probably joined to the Dekkan until relatively recent geological times. There are, indeed, references in ancient legendary history [which, however, should not be interpreted too literally] to the severance of Ceylon from the mainland. According to Tamil history, it occurred after the death of Ravana, about the year B.C. 2387. In the Mahawansa there are also references to great inundations on the western coast; these may have been due to the subsidence of the land, which must have continued for a very long period. We are told that one occurred about B.C. 504, during the reign of Panduwasa, and another about B.C. 306, in the reign of Devenipiatissa; the latter, which is very fully described, appears to have affected about fifty miles of territory near Kelaniya, destroying about 900 fishing villages, and 400 villages of pearl fishers. [These numbers are, of course, impossible, but the incident may be true.] There is also a traditional record of a drowned city called Mahabalipoor on the Coromandel Coast at no great distance from the northern extremity of Ceylon.

In recent years the sea has gradually been encroaching on that portion of the south-west coast which is most affected by the strong drift of water caused by the south-west monsoon. In 1921 a large piece of land to the north of Hikkaduwa was flooded and a house standing on a small rocky elevation was isolated from the shore, so that a small island was formed, while for years afterwards the dead tree stumps could be seen in the water. Though on the whole the island has been subsiding for such a long period, there have been short periods of elevation. Ample proof of this is furnished by the deposits of coral and limestone which are to be found round the coast at a considerable height above the present sea level. It is a well-known fact that the coral polyp only lives under the water, so that when a coral reef is found some thirty to sixty feet above the present shore line it may be concluded that the land has risen so as to lift up the reef out of the water. In the same region near Hikkaduwa it is easy to see the remains of this coral reef; most of it has been completely covered with vegetation, but at the present time it is being excavated as a source of lime which is burnt for the making of mortar. The holes formed by these operations have become filled with water, and form a series of small lakes along the south-west coast; as this is stagnant water, and therefore liable to make the region unhealthy by forming a breeding place for mosquitoes, the Government has been obliged to exercise some control upon the removal of this coral.

In the Jaffna Peninsula and over part of the northern plain also, are the remains of an enormous raised coral reef much older than that of the south-west;

underneath it there is also a substantial bed of sedimentary limestone of Miocene age made of the shells of sea creatures other than coral. This limestone forms the basis of the Jaffna Peninsula and extends for a considerable distance down the north-west coast. It has not yet been fully studied, but appears to thin off gradually to a line which extends roughly from the coast just north of Puttalam to points a little south of Elephant Pass and Mullaittivu. Along the southern coast there is also a narrow bed of limestone not formed from an ordinary coral reef, which must have developed during a short period

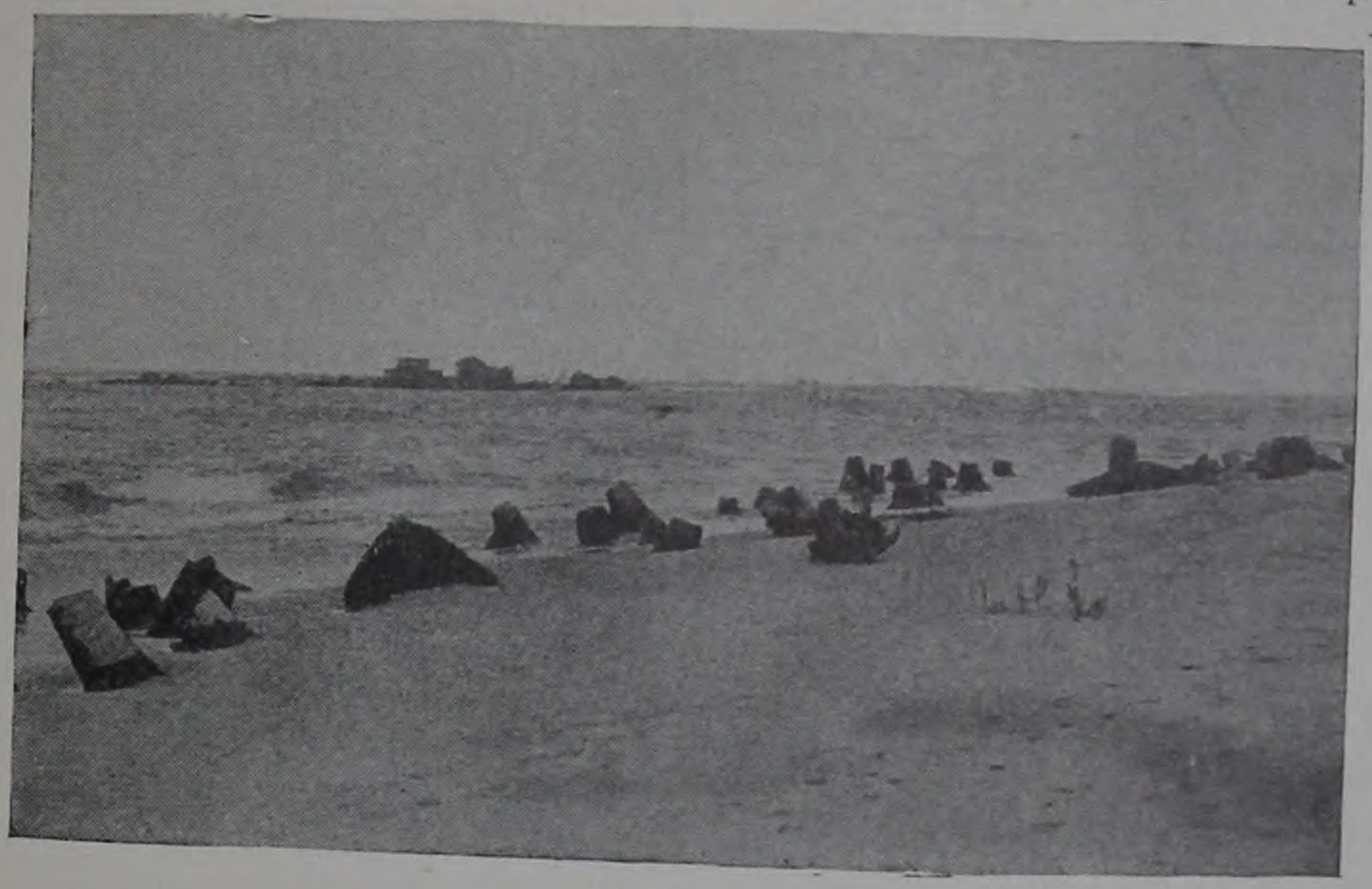


FIG. 21.
Piece of Land cut off by the Sea at Hikkaduwa in 1921.

of subsidence ; this can be seen at Hambantota. So that the island has evidently had many changes of level in its history (see Fig. 64 for limestone).

Another line of evidence of subsidence, which is much more difficult to understand, is connected with the appearance of river valleys. The subject requires much detailed study, and is briefly alluded to here for the benefit of advanced students. Many of the river valleys of the hill country appear to have been regularly eroded up to a certain point, after which they have become very much more steep ; so that at first a wide open valley was formed, into the floor of which the river has latterly cut more deeply. This is explained by supposing that when the land subsided, the lower courses of the rivers were

much reduced in length and thus the gradient from source to mouth was increased and the currents became more rapid. The rate of erosion would then increase and the rivers would cut more deeply into the valleys. This is illustrated in the following diagram of the valley of a tributary of the Mahaweli Ganga (see Fig. 22). It can be clearly seen by climbing up the hill called the Duke's Nose at Hatton, from which a large section of the Mahaweli Ganga and several tributary valleys are visible.

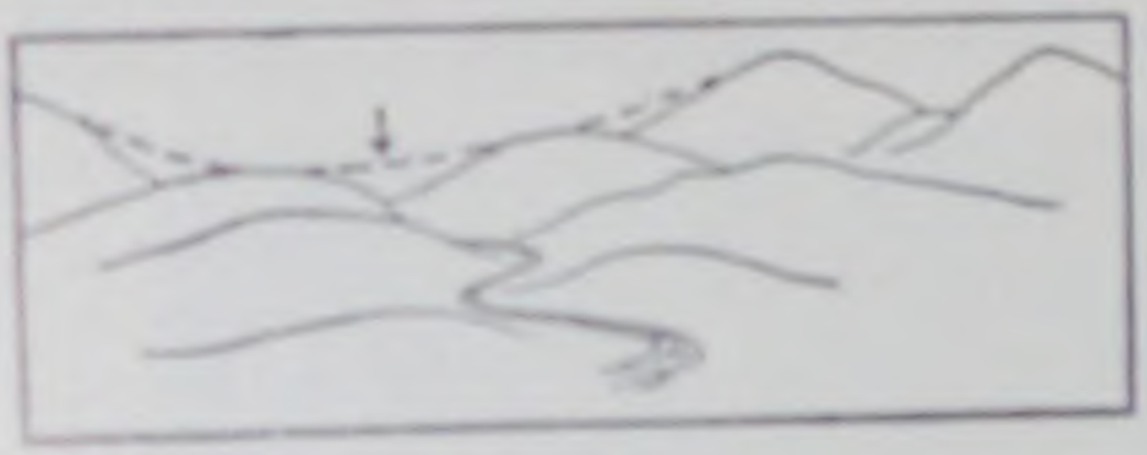


FIG. 22.

Diagram of Part of Maskeliya Oya Valley. Dotted line shows old valley level. Arrow indicates newer valley.

The greater part of Ceylon consists of a solid mass of **crystalline rock** of great age, the Sinhalese name of which is "kalugal"; it is composed of a mixture of crystals of various substances in varying proportions. This Archaean complex consists of a fundamental basement of gneiss which is overlain in the central and north-eastern areas by thick metamorphosed sediments consisting of quartzite, crystalline limestone, granulite, etc. These crystalline metamorphic rocks are grouped together as the Khondalite system. They are the principal carriers in Ceylon of economic minerals such as graphite, mica, and precious stones. What the original crust of the earth was like we do not know, but all the very ancient rocks have been so intensely folded and disturbed that they have been altered into a streaky (or foliated) series of rocks made up of many different crystalline minerals. Gneiss is the commonest form; finer grained rocks are called schists, while some of the crystalline limestones belong to the same series. These ancient streaky rocks were also invaded by molten or "igneous" rocks from the heated lower levels of the earth's crust, and the molten rocks, (of which a typical example is granite), later solidified, but not before they had baked up and altered the surrounding rocks still more. The extent to which they have been changed and contorted may be judged by the undulations of the foliation lines which may be seen on a freshly cut surface (see Fig. 23). The student should, if possible, visit a number of quarries or railway cuttings and compare the rocks from the point of view of the variety of minerals and the nature of the foliation; there are remarkable variations in different parts of the island.

Granite and gneiss have similar effects upon the geographical features of any region, *e.g.* land forms, water circulation, soil and minerals. Gneiss underlies

most of the other rocks of the earth's crust, though in many lands it has been so thickly covered by immense beds of sedimentary rock (sandstones, limestones, etc.), that it cannot be seen at the surface and has only been discovered by means of deep boring. The relics of Gondwanaland have many large masses of gneiss at the surface. It can be seen in South America, in the Guiana

FIG. 23.
Foliation in the Crystalline Rock.

Highlands and Brazil; the former of these regions has many features in common with Ceylon because its climate and therefore its vegetation is similar. Finland, Scandinavia and the Central Core of Angaraland are also largely composed of gneiss. A Canadian geologist, Dr. Dawson Adams, published in 1929, in the *Canadian Journal of Research*, a valuable account of the geology of Ceylon. In this work he remarks upon the similarity in structure between the rocks of Ceylon and those in the area surrounding Hudson Bay, which

is commonly called the "Canadian Shield"; in this region, however, many of the surface features are very different owing to the great difference in climate.

Most of the crystalline rocks of Ceylon are banded or have horizontal joint planes, *i.e.* they have for some reason become split horizontally and present the appearance of huge slabs laid one upon the other. There are usually also many vertical cracks in each bed. This feature has a very important influence

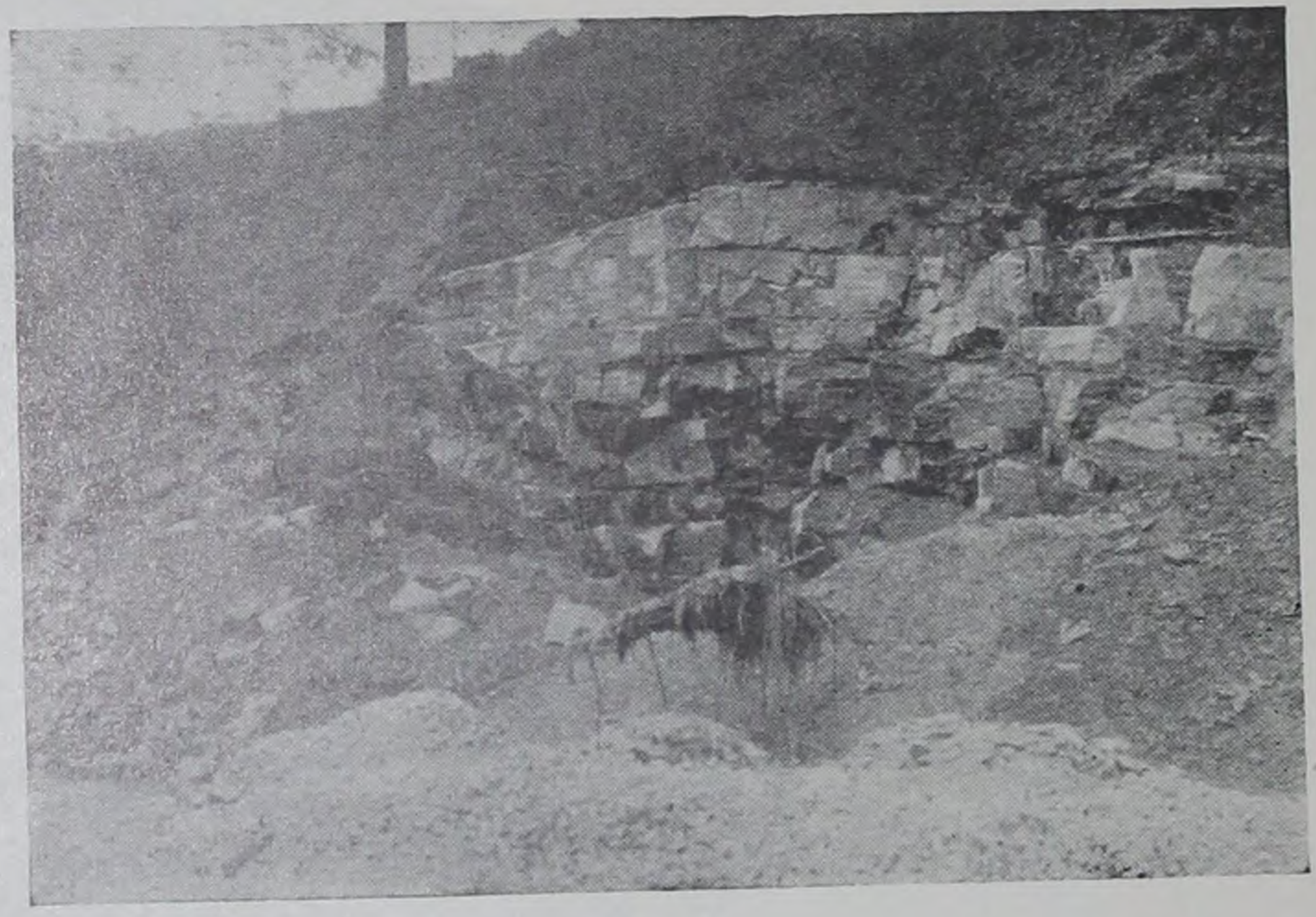


FIG. 24.

Banding in the Crystalline Rock. A quarry near Hatton. Stone used for road metal. Vertical joints can also be seen. Compare with Figs. 25 and 26.

on both the water supply and land forms, as will be shown later. In many parts of the hill country this structure can easily be seen; the Ramboda pass is particularly recommended for practical study in this and many other structural features.

Geologists can produce plenty of evidence of the fact that the gneisses of Ceylon have been subject to a tremendous amount of disturbance throughout their early history. One sign is the presence of a large number of minerals only formed under such conditions—especially the beautiful dark red garnet crystals which are so common. The rocks have been greatly cracked and

folded, and the beds are seldom level; in many places the tilt is almost vertical and great masses have broken off, leaving tremendous precipices. Where the tilted beds strike the surface long ridges are frequently formed (see Fig. 25). The structure is described by Dr. Dawson Adams as follows: "Speaking generally, the gneisses on the west side of the Island dip to the east, while those at the east side of the Island dip to the west. . . .

"The Island is thus a great syncline" (=downfold) "whose axis runs throughout its length, in a general north to south direction, passing a short distance to the east of Kandy and of Nuwara Eliya. . . .

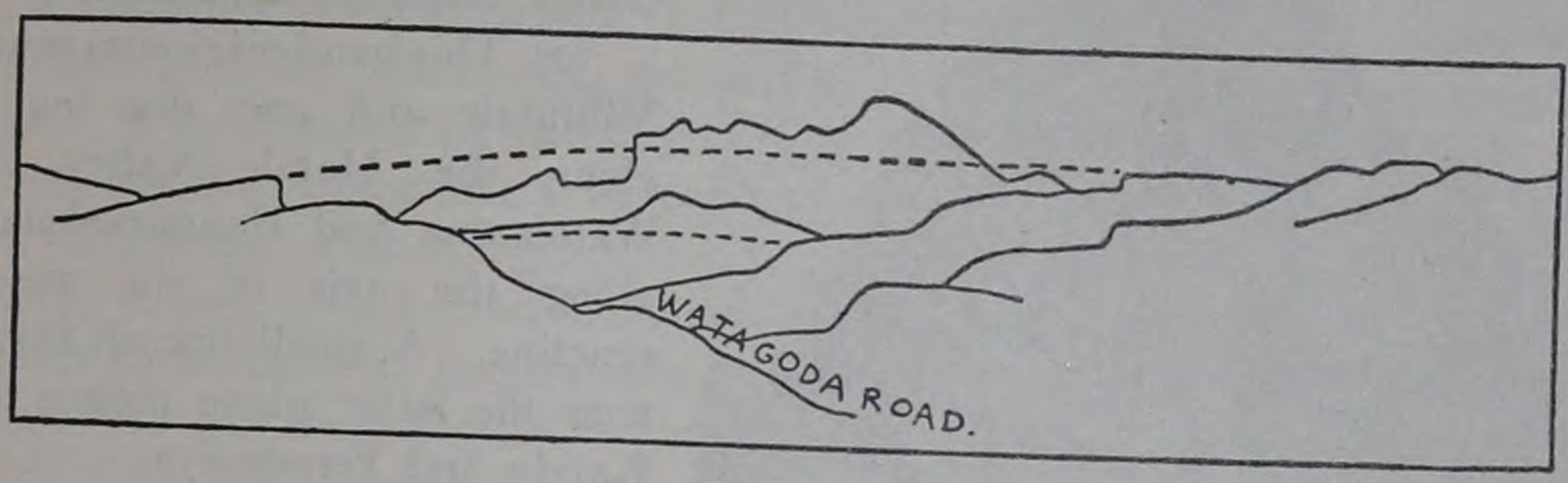


FIG. 25.

Diagram of a Portion of the Ramboda Pass. This pass is a huge rupture in the banded crystalline rocks.

"This syncline is closed on the south by the great sweep of the strata around the southern part of the Island here dipping everywhere inward, that is to the north, but it is open to the north where the strike of the gneiss before sinking beneath the low land covered by tertiary deposits commences to open out, . . . in a trumpet-like form. This great syncline of archean rocks which constitutes the Island of Ceylon thus plunges to the north and disappears beneath the miocene strata which occupy the northern end of the island."

There are a number of smaller folds. A low anticline (=upfold) forms the front portion of the parallel Sabaragamuwa ridges bordering the Southern Province. Within the hill country itself, which contains the axis of the main fold there are several minor parallel folds, one being an anticline which is ruptured through the middle by that impressive structural feature, the Ramboda Pass.

Parallel with the lines of gneiss are a number of remarkable bands of white **crystalline limestone**, which have the appearance of veins of varying thickness from about two hundred yards to a quarter of a mile, tilted up in the same

direction as the gneiss. These beds have not yet been fully studied, but they have been traced for long distances and are divisible into three chief groups :

(1) The most extensive originates to the east of Puttalam and goes towards Kegalla, where it skirts the hill country, passing in front of Adam's Peak and sweeps round the southern platform (see Fig. 32) to Balangoda, Wellawaya, Passara and Badulla, from which it passes along the Badulla Oya and Mahaweli Ganga valleys to Trincomalee.

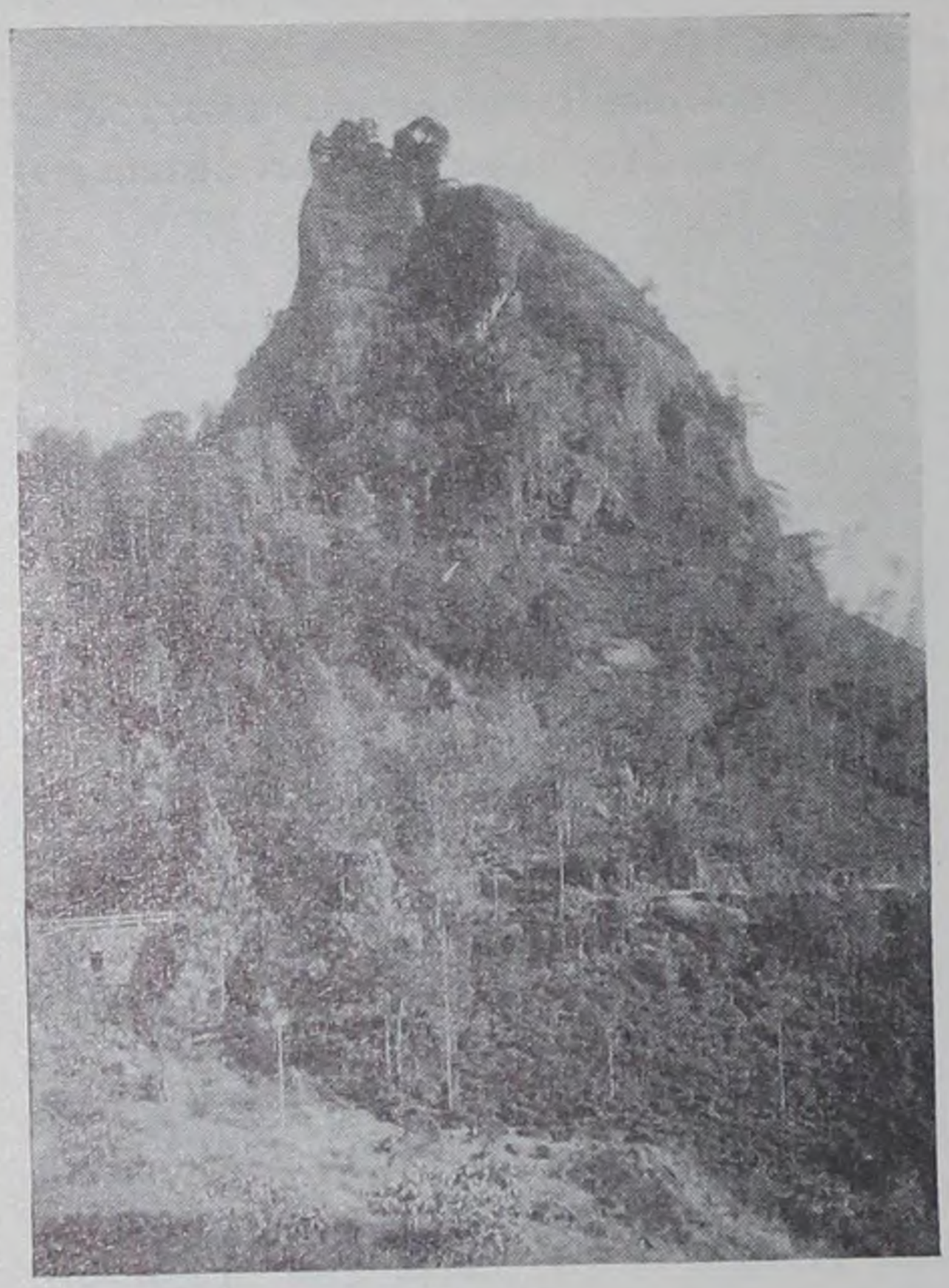


FIG. 26.

Ruptured Gneiss in the Ramboda Pass. Note the steep descent and road cut out of the rock. The valley floor is far below the base of the photograph.

(2) This band originates near Mihintale and goes due south along the Matale Valley to Wattegama and Hanguranketa, along the axis of the main syncline. A small branch from near the latter place crosses to Kandy and Peradeniya.

(3) A series of bands lying behind the Rakwana hill country, the chief of which begins near Ratnapura and curves round towards Hambantota.

The lime obtained by heating the rock in certain parts of the hill country is drawn from quarries in these bands. The most numerous quarries are near Kandy, Matale and Badulla. It cannot be too strongly emphasised that the student should verify these facts by actual observation in the field wherever possible. These quarries are, for instance, easily accessible and exceedingly interesting. Sometimes the limestone has been dissolved out by surface water and forms the floors of valleys and is therefore not easy to trace. Like all limestones it contains a large number of caves.

Though there are no actual volcanic craters in Ceylon, molten rock forced

itself up through the cracks and cavities formed during the extensive earth movements and solidified before it reached the surface. The rocks thús formed are described as **igneous** (=literally " of fiery origin "). Much of this rock is in large table-like masses which have been intruded between the banding planes of the gneiss. The chief igneous rock of Ceylon is called " charnockite " and is a granite but composed of different minerals. Granite consists of a more or less even mixture of quartz, mica and felspar ; in charnockite the mica is replaced by other minerals. The igneous rocks are not usually foliated like the gneisses. Like granite charnockite differs considerably and is known by a number of different names. It is often granulitic in texture—*i.e.* composed of small irregular interlocking grains which have not the normal crystalline form. A form called pyroxene granulite which is fine-grained and dark in colour is a favourite material for road metal. The largest beds of charnockite are to be found in three regions :

(1) A large area behind Colombo, roughly from the mouth of the Kelani Ganga to Ambepussa, Ruwanwella and Moratuwa.

(2) An area including the Piduru Ridges, the High Plains and the Southern Wall of the Hill Country (see Fig. 32).

(3) The central portion of the Rakwana Hill Country.

Charnockite does not differ sufficiently from gneiss to produce any very great difference in the character of the country. We may note, however, that it forms the most imposing structural feature in the island, the Southern Wall of the Hill Country (see Figs. 34A and B).

Minerals are usually abundant in ancient crystalline rocks, especially the precious metals ; their actual distribution seems to be more or less accidental. Ceylon is only moderately well endowed with minerals at present ; it has, however, been so long inhabited by civilised people that most of the accessible material must have been removed long ago. Judging by the accounts in the Mahawansa, gold and silver seem to have been obtained by the ancient kings from sources within the island. The minerals may be broadly divided into two groups : (*a*) those occurring in veins or lodes, (*b*) those occurring as individual crystals or particles mixed up with the other constituents of the rocks.

Graphite or " plumbago " is the chief mineral which is found in veins and lodes. The chief mines are situated in the south-west portion of the low country in the West Central, Western and Southern provinces and along the adjoining edge of the hill country. It is sometimes in solid masses and sometimes in curious flakes which form beautiful flower-like structures in rounded

holes. The best known use of graphite is for lead pencils ; it is also made into a polish for cleaning iron fire-grates and used extensively in powder form as a lubricant for machinery. In recent years, however, with the growth of the iron industry in the various industrial countries, it has become exceedingly important because it is the most satisfactory material to use for the crucibles in which iron is melted down for steel.

Mica is another mineral which is found in veins in considerable quantities in Ceylon. This curious substance occurs in crystals, which when knocked will split up into a series of fine, tough, glassy, plates, which can be used for the windows of furnaces instead of ordinary glass, because, like the graphite, they can stand enormous heat. It commonly occurs in three forms, black, white and yellow, the last being fairly abundant in Ceylon. There are no veins of sufficient size to warrant extensive mining operations, like those in India ; but the yellow mica deposits near Kandy have become important in recent years on account of the use of this mineral in wireless telegraphy.

A very remarkable rare mineral called thorianite, which was first found in Ceylon (in 1903), is also associated with veins. It is used in the manufacture of incandescent gas mantles, and is also radio-active. It was first found in river gravels and in the black sand formed by the weathering of up-country rocks. It is evident, however, that the source of this mineral must be somewhere in the hill country awaiting discovery. The dense mantle of vegetation with which the island is clothed makes the investigation of the rocks a matter of peculiar difficulty.

Iron ore exists in many areas as nodules embedded in the crystalline rock and also in more extensive masses which have been produced by gradual chemical changes due to the action of sun and water on the rocks. This source of iron has never been much exploited nor have the resources been thoroughly investigated. Six million tons are estimated to be available at present, principally in the following belts of country : (*a*) Kalutara to Baddegama ; (*b*) Eheliyagoda to Kahawatta ; and (*c*) Matara to Akuressa.

The chief crystalline minerals are, of course, the **gem stones** which are so exceptionally abundant in this island as to have entered into its trade from the earliest times (see Chapter I., Historical Geography). The gold, silver and other metals which were formerly found also occurred as particles mixed with the other crystalline constituents. Gems have never until quite recently been discovered or worked in the bed rock ; the sapphire and beryl have been found *in situ* near Matara and Kandy. They have usually been found in the material

produced by the disintegration of the rock and carried down by rivers to the low country. Further reference is made to this subject in the chapter on surface deposits.

Black sands containing about 75 per cent. ilmenite and 25 per cent. zircon, rutile, garnet, monazite, etc., occur at Pulmoddai ($3\frac{1}{2}$ million tons) and in smaller deposits at Tirukkovil and elsewhere along the coasts. Ilmenite is used in the manufacture of high-grade paints, titanium alloys, etc. Monazite occurs in larger proportion chiefly in the beach sands of the south-west and west of the island at Induruwa and Kudremalai.

Let us now try to get a picture of the structure of the island as a whole. It is a vast crystalline block, 25,332 sq. miles in area (about half the size of England), composed of rocks which, though differing greatly in composition in different parts, have more or less uniform physical characteristics. The block is divided distinctly into two portions differing only in elevation, commonly known as the Low Country and the Hill Country. The latter occupies about one-fifth of the area and lies towards the southern end of the broader portion of the island. The shape of the island as a whole is often compared with that of a pearl or a mango. It is, for instance, called " the Pearl on India's brow." The surface of the low country is rounded and undulating, and in its widest portion is placed the hill mass, like the ramparts of a mammoth castle. In the hill country itself the characteristic outline of the land forms is rounded ; Adam's Peak is almost unique with its pointed summit. Round the edges of the pearl, in the various limestone and coral beds and sand dunes, we have the traces of sea-floor deposits left by the waters in which it has been standing since its severance from the mainland ; these deposits, however, are as a rule so narrow that they have little influence on the geography of the country as a whole ; only in the Jaffna Peninsula with its neighbouring islands and the north-western coast is there an area sufficiently extensive to form a distinctive natural region.

PART II. CHAPTER 3

SURFACE DEPOSITS

THE softer deposits which practically everywhere clothe the surface of Ceylon have for the most part been formed by the breaking up of the crystalline rocks. This is brought about in two ways :

(1) By the ordinary processes of weathering and erosion, *e.g.* by rain and river wash or the action of the sea ;

(2) by chemical changes in the actual substance of the rocks.

The latter process is more fundamental and extremely important in Ceylon owing to the vigorous action of great heat and moisture combined. The former process is mainly instrumental in carrying about material which has been formed by decomposition, and depositing it elsewhere—that is to say, in the formation of what are known as transported soils.

In order to understand the building up of soil by chemical changes, we must enquire more closely into the detailed structure of the crystalline rock. The student is advised to collect specimens from the heaps used for road-mending, and also to examine in some detail any ordinary kalugal quarry. The rock may usually be divided into two classes : (*a*) containing more light-coloured minerals ; (*b*) containing more dark-coloured minerals. The difference between these two mainly depends upon the proportion of a mineral called quartz, which is by far the most important of the minerals composing the earth's crust. **Quartz** can be easily distinguished, especially when it appears in larger crystals, by its glassy appearance and its great hardness. In its purest form (known as " rock crystal ") it is clear like glass, will produce an extremely fine cutting edge and is sufficiently hard to scratch on glass. In books upon primitive man in other countries, we read a great deal about the use of flint implements ; flint is chemically similar to quartz, but different in form. There is no flint in Ceylon, but the primitive men made for themselves the same types of implements from glassy pieces of quartz ; a large number of these have already been found, and may be seen in the Colombo Museum. In

the ordinary way, however, quartz is more or less impure, and the impurities give it a dense appearance and occasionally very beautiful colouring effects. The amethyst, opal, carnelian, citrine quartz, and cairngorm, which are all found in Ceylon, are different forms of quartz which are cut as gems. One important characteristic of quartz is the fact that it is very stable, *i.e.* not liable to decomposition or chemical alteration, and remains practically unchanged in nature throughout the ages. It may be broken by degrees into smaller and smaller particles which will eventually form sand, but in composition it remains unaltered. Light-coloured sand usually consists largely of small grains of quartz. There are other minerals in the crystalline rocks which are more or less stable, a very common one being **mica**, which occurs in little flakes. Black mica and a number of other darker minerals form the dark grains in sand. Corundum, a rarer mineral, harder than quartz, is also found. When coloured bright red or blue it forms the ruby and the sapphire, which are the most important gems of Ceylon.

Practically all crystalline rocks contain a greater or less amount of an extremely complex mineral called **felspar.** This in its pure form is white in colour, but, unlike quartz, it is very liable to decomposition and chemical change. Impurities cause the mineral to assume various colours ; hence it is more often than not found in coloured form. It often gives the leading colour to a granite or gneiss, in both of which it is present in large quantities. Felspar breaks up with great rapidity in hot and moist countries like Ceylon. It usually turns quite soft and changes into a fine form of clay which is easily washed out of the rock, and hence loosens the particles of harder material. The student should examine a number of exposed surfaces of rock where this process can easily be seen ; and it is very instructive to examine the freshly cut surface in a quarry and to see the gradual transition from the solid rock to the crumbly material which gradually forms a mixture of sand and clay, the chief elements of soil. Under certain special conditions felspar forms a pure white clay called " kaolin " or " China clay," which is used for making porcelain ; this can naturally only be worked when an unusual quantity of felspar occurs in one place. A great deal of kaolin is to be found in Ceylon. Nearly ten million tons are estimated at Boralesgomuwa, a few miles from Colombo. Other deposits occur in the low-lying deniya lands of the wet zone. They can form the basis of a profitable export trade, as the reserves are far in excess of the local demand. When a certain variety of felspar in its purest form is in the first stages of decomposition, it sometimes develops minute scales of kaolin which reflect the light

and give to the mineral a translucent appearance ; when the most compact portions of it are cut, rounded and smoothed, they look like solidified drops of water glistening in the sun ; these are called moonstones. In and around the old moonstone pits at Mitiyagoda, near Ambalangoda, many of the foregoing statements can easily be verified.

The surface deposits on crystalline masses within the tropics are usually very different from those in the temperate zone, particularly in climates which are both hot and wet. Owing to the alternate baking of the surface by the sun and soaking by heavy rains, many complex chemical processes are set up and tremendous changes occur, even to a depth of some forty or fifty feet from the surface. These processes are very varied in their nature and results and have not yet been completely investigated. They result, for instance, in the gradual replacement of one mineral by another, near the surface, or in the complete transformation of the whole of the mass of rock, so that it is difficult to believe that the materials before and after the change are in any way connected. Reference has already been made to the masses of iron ore (composed of hematite, an oxide of iron) which are found in the hill country and are probably the result of replacement of one mineral by another. The most interesting product, however, of these complex chemical processes is the substance commonly known in Ceylon as "**kabouk.**" To geologists it is known as "**laterite,**" the name having been formed from a Latin word meaning "brick" on account of its resemblance to bricks, when cut into blocks and dried. This substance is practically unknown outside the tropics as it is the result of the alteration of crystalline rock in a hot and moist climate ; the kabouk specially used for building represents a very advanced state of transformation of the underlying rock. The latter is like a very stiff clay which can be cut with a spade, but rapidly hardens on exposure to the air ; the dominant colour is a bright red, but freshly cut surfaces often have a mottled appearance with various shades of blue, green, orange, brown and yellow. It is riddled with round holes, like a sponge and hence is very porous and not impermeable like an ordinary clay. The formation of laterite "takes place in hot countries where there are well-marked wet and dry seasons. In the wet season the rain water soaks into the rocks and dissolves some of the constituent minerals. In the dry season the surface layers dry and the circulating water is forced to deposit the substances it has taken in solution ; one of the chief minerals thus depositied is iron oxide. It is iron oxide which gives the red colour to laterite and forms the porous network so well marked in this substance. The insoluble minerals, especially

quartz, are left to fill the interstices." (Dr. L. D. Stamp.) Though there is not a well-marked dry season everywhere in Ceylon, the same effect is produced by the alternation of bright sunshine and short showers during the day.

The true kabouk used for bricks is only found in the south-west portion of the low country, roughly from the Maha Oya (north of Negombo) to the Nilwala Ganga (Matara). It usually develops on flat platforms of rock where the surface deposits are only slowly washed away, and where the climate is very wet. On the edges of this area the surface deposits gradually alter as the rainfall diminishes. Many different grades of red earth, which may be described as lateritic in character are to be found throughout the island ; they show considerable variation in texture and composition. In the driest regions the compact form of clay is seldom found ; it is generally replaced by masses of loose material of various reddish or brownish shades. In the hill country the surface deposits also change in type, not so much on account of diminished rainfall as because the broken up material is more quickly removed by rain-wash. The student should study and compare a number of different cuttings in the surface deposits ; from top to bottom of a deep cutting the gradual change from the original rock to the lateritic material can easily be recognised. Often the foliation lines remain in the altered material. Many cuttings can be seen from the train—*e.g.* in the journeys from Colombo to Galle or Kandy ; on the latter journey the gradual transition to up-country soils can be seen.

According to the composition of the rock from which it was formed, laterite contains one mineral or another in greater predominance, but compounds of iron and aluminium are generally abundant. It is usually classified according to the proportion of each of these minerals present. In the olden days the material in which iron was most abundant was used for smelting by the Sinhalese and indeed small forges were common in the villages until about thirty years ago. The industry was destroyed by the competition of cheap iron from Europe and America and the last forge ceased to function in 1904 (at Balangoda). When more aluminium is present the laterite is described as bauxite. Bauxite is the chief aluminium ore and is very abundant in the laterite of some tropical countries. The best deposits now being worked are in British Guiana. Ceylon, however, has not yet been completely surveyed for bauxite ; it is, no doubt, a possible development in the near future as there is now such a demand for aluminium in the world. If discovered, it would offer scope for the development of hydro-electric power, because the metal is separated from the ore by an electrical process.

The chief **transported soils** of Ceylon are those formed by the action of running water, and are therefore called "alluvial" deposits; they are naturally more abundant on the low country, because the current of the rivers is there very much slower, and more material is deposited. The land near a river which at any time is covered by deposits carried there by the river is called its **floodplain.** In the hill country the floodplains are naturally quite limited in extent, but in some parts of the low country, *e.g.* near the mouth of the Mahaweli Ganga, they occupy a very large area because of the extensive floods which occur at certain seasons of the year. Fig. 55, upon which the areas liable to flood are marked, gives us some idea of the extent of the floodplains of all the larger rivers, and hence of the distribution of alluvial soils. It must be remembered, however, that the floor of every valley containing a river is bound to have a certain amount of transported soil. This is the type of soil most used for the cultivation of paddy, especially the portions which are immediately near the rivers; in fact, a detailed map, showing the areas of paddy cultivation, would give us almost exactly the distribution of the most productive alluvial soil. [See Fig. 68.] As a rule, it differs from the lateritic soils in being dark in colour, and contains considerable quantities of decayed plant remains (called vegetable humus), which darken the colour and greatly add to the fertility of the soil. The lateritic soils are, throughout the tropics, not considered to be very fertile; the productivity of their cultivated sections seems to depend more upon the effects of great heat and moisture than upon the actual quality of the soil. Many plants in a hot wet climate will, like the coconut, flourish in spite of the medium upon which they grow; the latter plant, for instance, is to be found growing in sands which have been heaped up by the sea, which contain practically no plant food, or even with its roots clinging to a rock which is

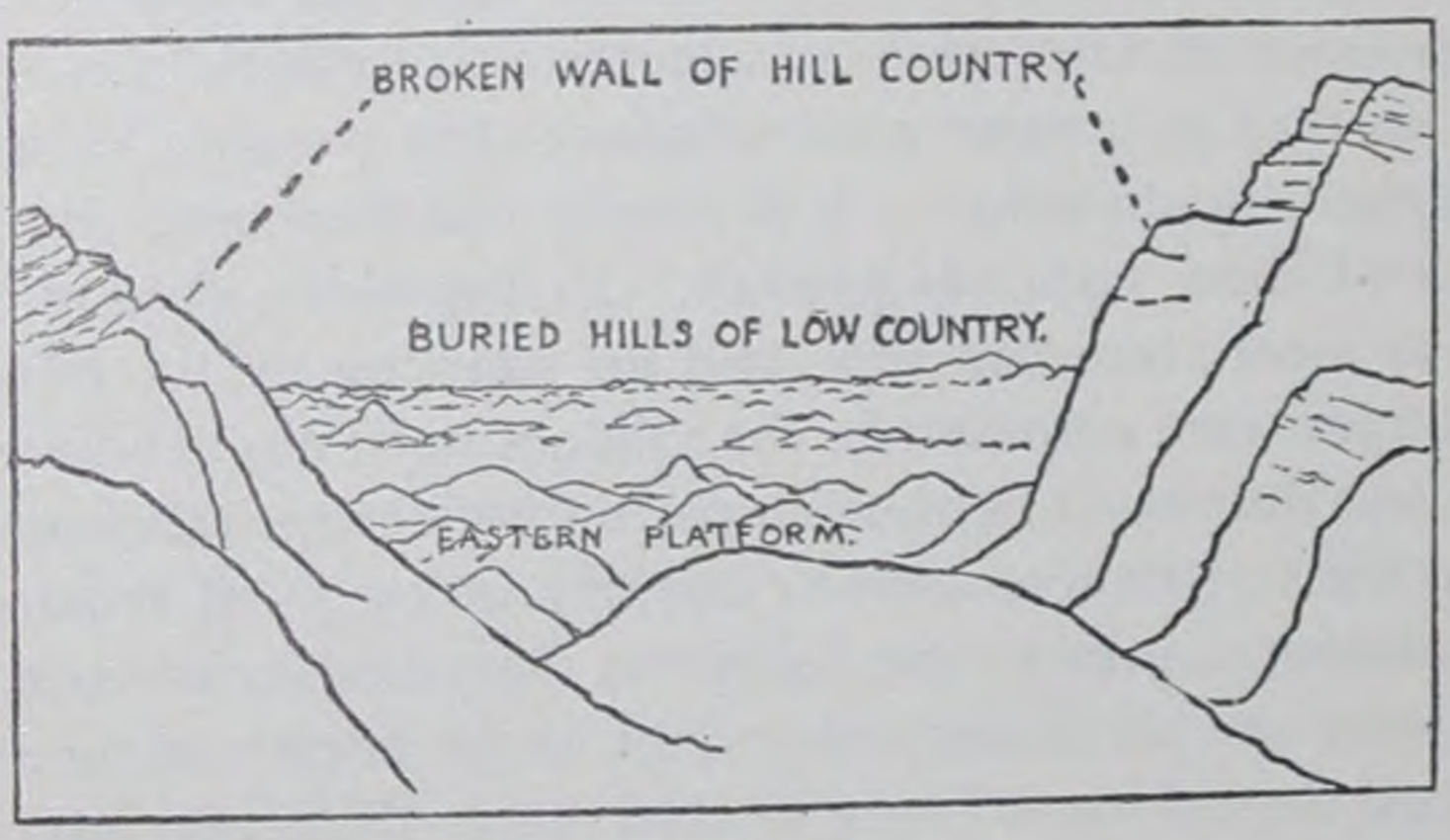


FIG. 27.

Diagram of the View from Ella Gap, looking S.E. over the Low Country. [See Fig. 32.]

covered by but a few inches of soil. The ancient people long ago picked out the patches of fine dark soil in the alluvial deposits, which are really the most fertile in Ceylon, for their paddy culture.

The surface of the crystalline rock in the low country is very uneven, and without the surface deposits would appear like a series of low hills, some of

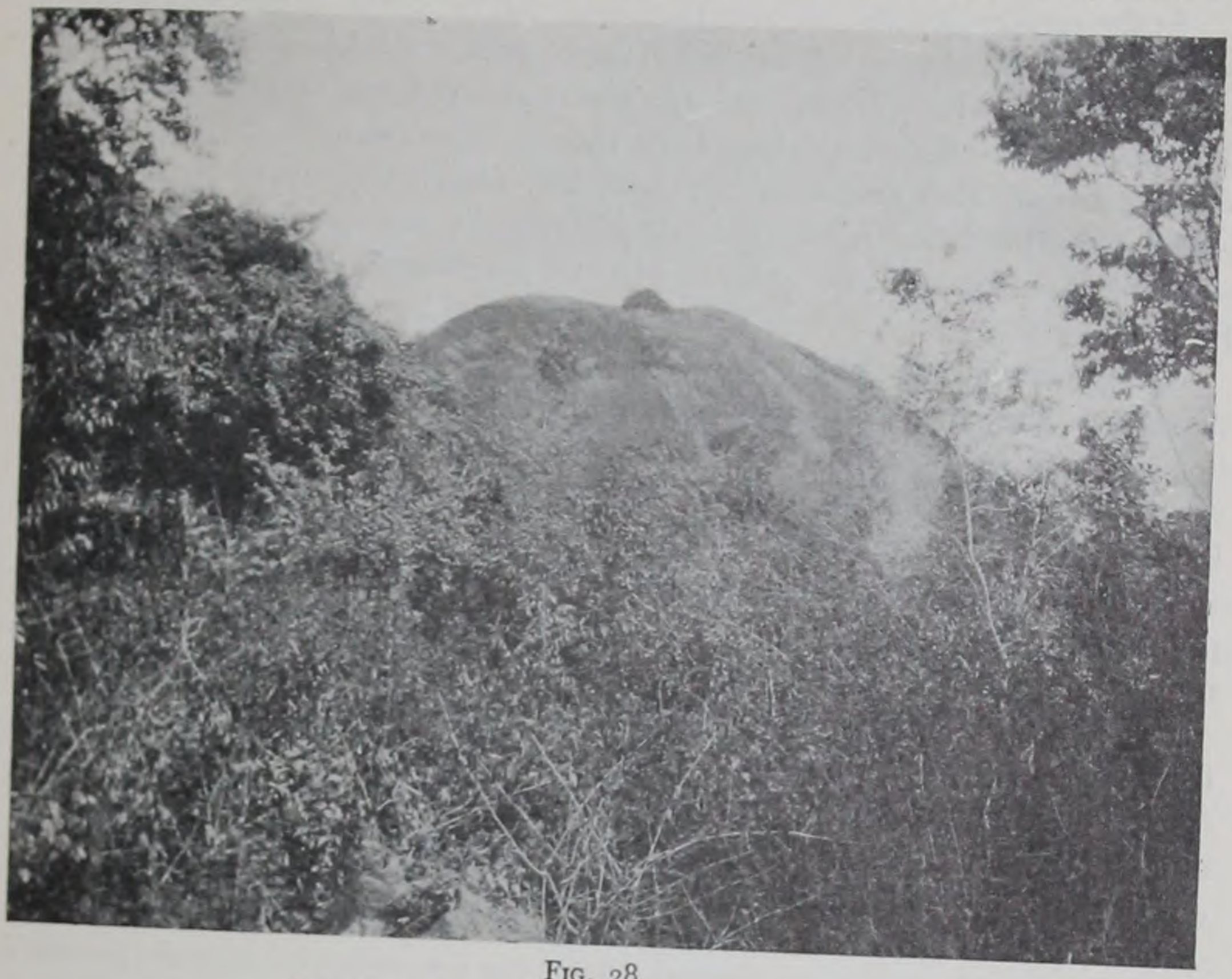


FIG. 28.
The Top of a Buried Hill in the Low Country.

which would reach to a considerable height. These hills have, however, been gradually buried, so that now much of the surface is completely level, and the tops of the hills only just show through ; they show more and more as the elevation increases on approaching the hill country. As they retain the general rounded outline which is so characteristic of gneiss, they are of a more or less uniform character. Often they are almost bare of vegetation and have the appearance of the back of an enormous animal. Though the Elephant Rock at Kurunegala has become so famous, there are many curious rocks of

this type all over the country. In a few places where the rocks are very much banded they stand out of the lowland deposits in the shape of buildings ; Sigiriya Rock in North Central Province and Westminster Abbey Rocks in Uva Province are of this type. When a large cutting is made in the low country the undulating outline of the crystalline rock can easily be seen.

In the surface deposits all over the island can be found certain special forms of clay, apart from kaolin. The chief of these are pottery clay, and the brick clay which is not laterite. These clays are nearly always found in alluvial deposits. The pottery clay which has long been used in the making of cooking vessels, water-pots and other articles of every-day use, is fairly well distributed over the island. The brick clay is mainly in the hill country and has given rise to a considerable industry of some antiquity in the neighbourhood of Kandy and of Badulla.

Reference has already been made to the gems which occur in alluvial deposits. They are most numerous in the crystalline rock in the south-west portion of the hill country, and are mainly found in the soft material washed down the front of the hill wall of this area and deposited on reaching the low land. Ratnapura (meaning in Sinhalese " the Gem City ") is the central town of the gem-mining region ; the miners must move about from point to point to find suitable working material in the river valleys ; at present the chief mines are near Pelmadulla.

The surface deposits of the northern limestone region are entirely different from those in any other part of the island. As the sub-soil is of limestone, which is exceedingly porous, the rain water drains very quickly away from the surface and circulates underground. For this reason the soil is very thin and quite different in character from anything to be found elsewhere. In colour it is an extraordinary golden brown, or slightly tinged with red, and hardly seems connected with the white limestone upon which it lies ; it is not, however, infertile, provided that it can be kept sufficiently moist by artificial watering. There is, of course, a great deal of sand thrown up by the sea and blown across the peninsula. Much of the soil in an around the Jaffna Peninsula is very saline because of the evaporation round the edges of the sea-water lagoons, and is therefore almost useless.

Blown sand is common all round the coastal regions and often extends as far as ten miles inland, veiling any other deposits that may exist. These regions are generally used for palmyra or coconut plantations. There are also many long dunes and sand bars round the coast. These contain several hundred

million tons of high-grade glass sands, especially near Point Pedro. The reserves are so large as to allow a considerable surplus for export.

Over fifty million tons of **peat** with 50 to 60 per cent. combustible matter occur in the Muthurajawela swamp, south of Negombo lake, as well as in the lower Kelani Valley.

Owing to the tremendous rainfall in the hill country of Ceylon—not so much its annual amount as the heaviness of single showers—great care has to be exercised in the removal of natural forest growth from the hill slopes for purposes of cultivation. In the ordinary way the forests, by impeding the circulation of water and preventing sudden floods, and also by protecting the surface from excessive drying and rapid erosion, help to maintain a good depth of soil on the hill slopes. On the tea and rubber plantations the loose, light red soil which seems to suit these plants so well is often found up to a depth of several feet when the land is first cleared. This state of affairs, however, would not last very long if special precautions were not taken to maintain the soil on the plantations. Care must be taken, for instance, to leave a certain amount of tree growth near the top of a hill and also to maintain a series of drainage trenches so arranged that the water will get away fairly quickly without carrying off much of the soil. The planting of grevillias or other trees in between the tea plants is naturally a great help ; also the use of small " cover " crops like vigna. On both rubber and tea plantations a great deal of the surface is kept absolutely free from weeds, becomes exceedingly dry under the hot rays of the sun, and is apt to be removed by the wind. The removal of the weeds also prevents the development of the valuable vegetable humus. For all these reasons, any kind of deforestation of the mountain slopes must be carefully watched, and the supervision of such matters is an important part of the work of the Government.

The principal determinants of soil are bed-rock, climate, topography and vegetation. As a result of the interaction of these, the following soil types are formed in Ceylon :

(*a*) Kabouky and gravelly loams of the wet zone, *viz.* : the centre and extreme south-west.

(*b*) Red loams of the dry zone.

(*c*) Small areas of humic soils in the patana grasslands of Uva, the fern-lands of the Sabaragamuwa strike valleys and the peaty areas around the south-western lagoons.

(*d*) The terra-rossa, grey loams and other calcareous soils associated with the sedimentary limestones of Jaffna, and (*e*) Alluvium and coastal sands.

PART II. CHAPTER 4

RELIEF

THE relief of any country is so closely bound up with its geological structure that references to many of the relief features of Ceylon have unavoidably entered into the sections upon Structure and Surface Deposits. The student should, for instance, have already formed in his mind a general picture of the appearance of the island. It now remains to make a more systematic study of the details of that picture.

Ceylon is divided very clearly, from the point of view of relief, into two parts, (*a*) the low country, occupying about four fifths of the area ; (*b*) the hill country, occupying the remaining fifth.

In the relief map (Fig. 29) a three-fold division has been made, on the basis of height alone, into lowlands, uplands and highlands. Broadly speaking, the coastal areas lying below 300 feet are the true **lowlands.** This portion of the land has practically no hills, and is of the type already described in the last chapter, where the filling up of hollows by soft deposits has almost levelled the land, so that only a few of the ancient hill summits are peeping through a vast depth of soil (see Figs. 27 and 28). From the top of these rounded rocky elevations, which so often resemble the broad back of a recumbent animal, we may look out over the flat expanses of the lowlands ; many Buddhist temples have been built on these isolated rocks. There are a few points, however, of quite considerable elevation, such as Kataragama Peak, 1395 feet ; Wadinagala , 2413 feet, near Westminster Abbey Rock ; Sangilimala, 1343 feet, lying between Kantalai Tank and the Trincomalee Road ; and Paramakanda, south-east of Puttalam, 534 feet.

The land classed as **uplands** is that lying between 300 and 1200 feet. It consists of a varied country with many level stretches broken by low isolated hills like Maragalakanda, 3648 feet, near Muppane ; Ritigala, 2520 feet, about twenty miles due north of Dambulla ; the famous Dambulla (1146 feet) and Sigiriya (1144 feet) rocks, and ridges of considerable length like those which can be seen from either Sigiriya or Dambulla.

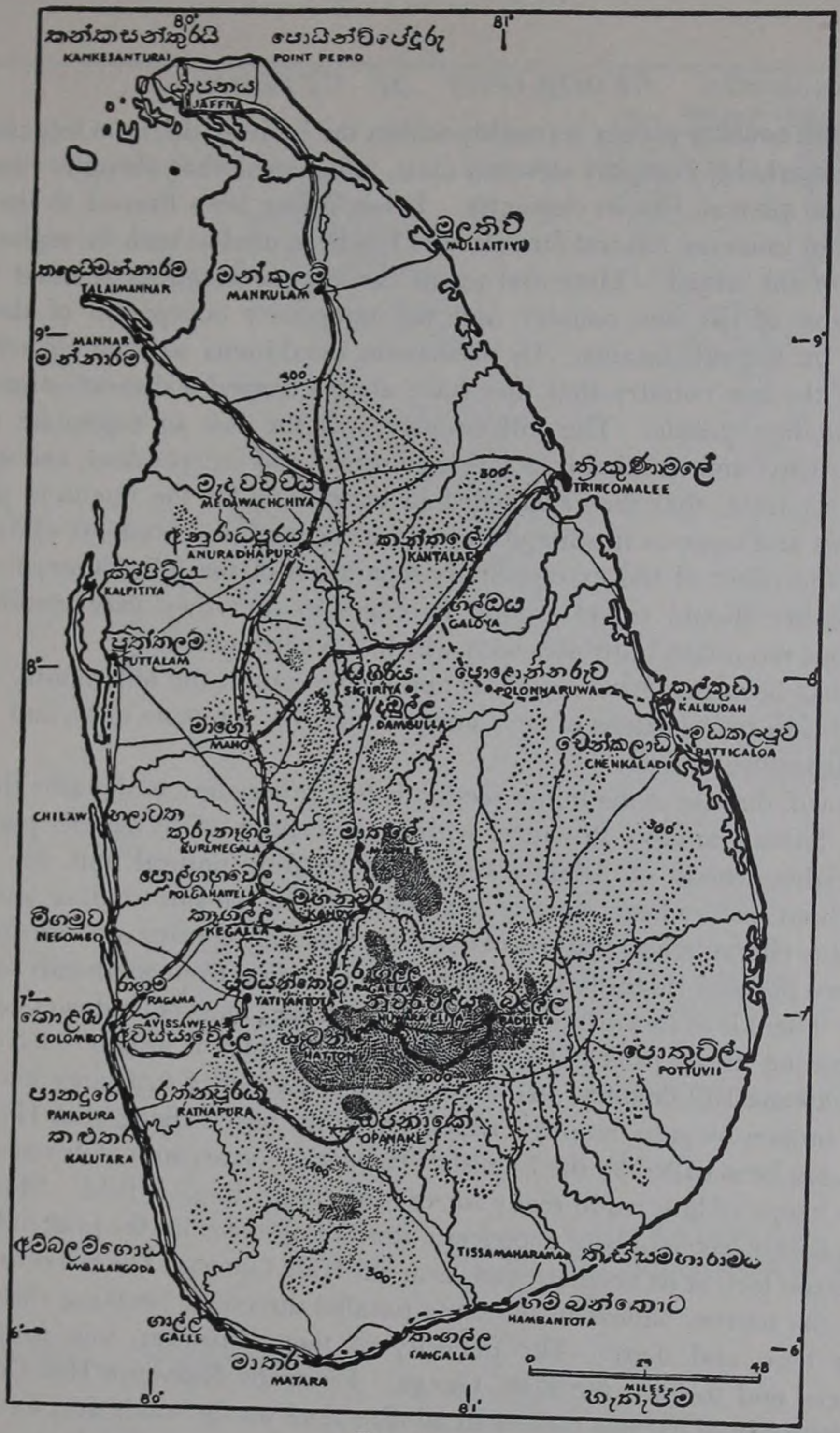


FIG. 29.

Relief and Routes. Main roads in thin black lines. Railways in broken black lines : total mileage, 951 miles. The line from Galoya to Batticaloa is now in operation. The extension from Matara to Hambantota has not yet been started. Greatest length of Ceylon is 270 miles ; greatest breadth, 140 miles.

The **hill country** proper is roughly within the limits of the 1200 feet contour. It is a remarkably compact elevated mass, rising somewhat abruptly round its edges, and plateau-like in character. It has before been likened to the ramparts of an immense natural fortress, and has been used as such throughout the history of the island. Time and again the various invasions resulted in the evacuation of the low country and the temporary occupation of their hill fortress by the inhabitants. Its permanent inhabitants were so cut off from those of the low country that they have always formed a distinctive group of the Sinhalese people. The hill country was the last to capitulate to the British Army, and its inhabitants were so sturdy and independent, and so completely separate, that they succeeded in bargaining for the retention of their own laws and customs in spite of the British occupation. Students who wish to realise the effect of the extraordinary separation of the hill country from the low country should travel around its edges so that they may visualise the enormous mountain buttresses with which it is surrounded.

As has been suggested in the section on Structure, the hill country can be divided into two portions of very unequal size, (*a*) the main mass, and (*b*) the Sabaragamuwa Ridges.

We will dispose of the minor section before proceeding to describe the main mass. Sabaragamuwa Province, with the exception of its eastern portion in the neighbourhood of Adam's Peak, is a separate natural unit, has always throughout history been more or less isolated from the surrounding lands, and has many characteristic features of its own. It mainly consists of a series of extraordinary parallel ridges lying roughly in a direction from south-east to north-west. There is at its southern end a more compact mass of land over 3000 feet, culminating in the peak of Gongala, 4465 feet, which is usually referred to as the **Rakwana Hill Country.** In front of it lies a series of straggling low ridges, much broken by gaps, amongst which stands the very striking peak Hiniduma, which has been called by the English " Haycock," on account of its resemblance to the heaps of hay made ready for carting, in an English field. Most of the ridges do not exceed about 1500 feet ; the foremost one has the peak of Kukulugala, 2300 feet, at its northern end, near the Kalu Ganga. The rivers are forced along the narrow valleys in the same parallel direction, breaking through the ridges here and there. The majority of them, however, join towards the northern end to form the Kalu Ganga. From the Rakwana Hill Country a large number of streams radiate in all directions on the south side, forming the Walawe, Nilwala and Gin Gangas. A very large portion of Sabaragamuwa is

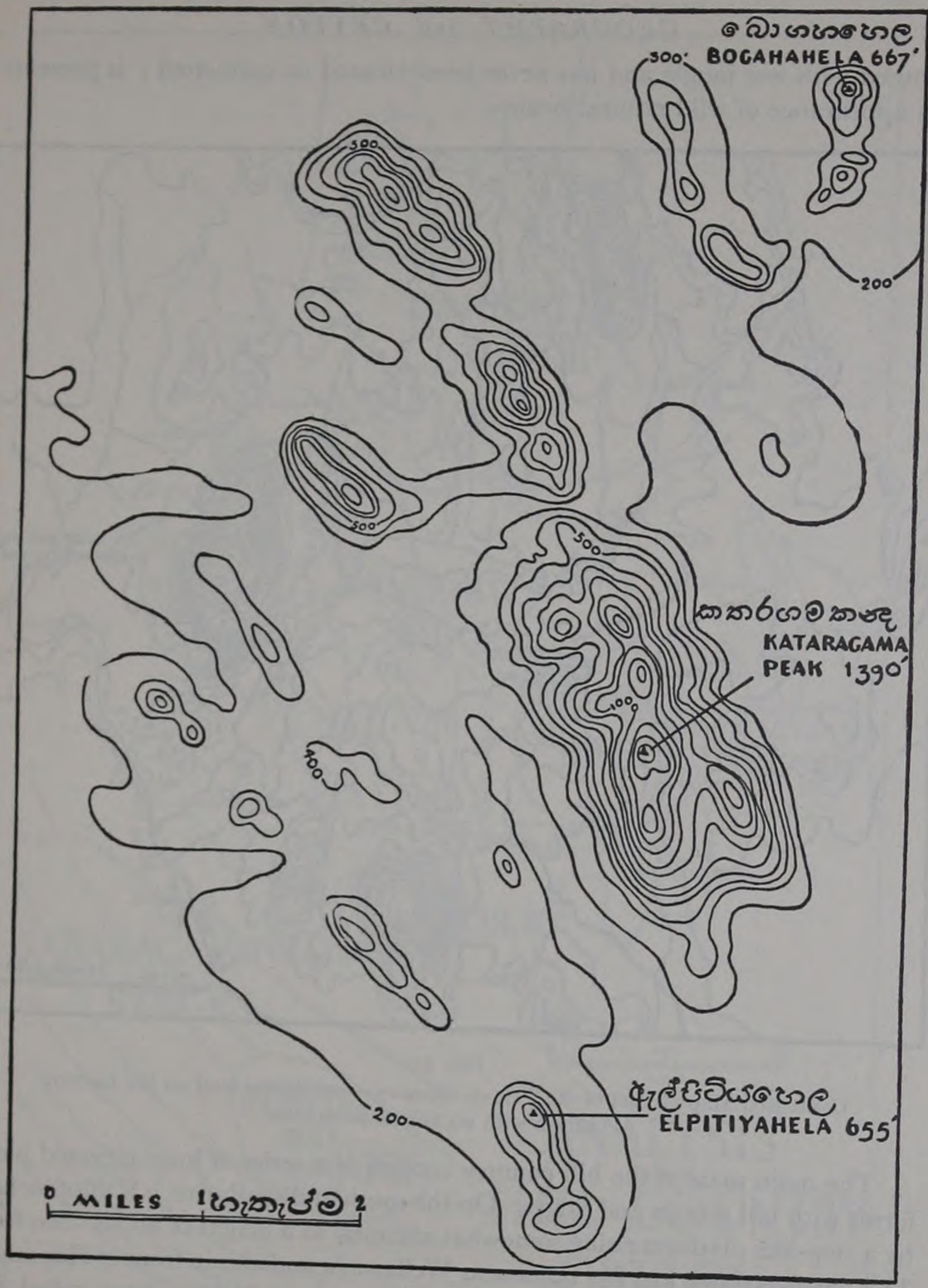
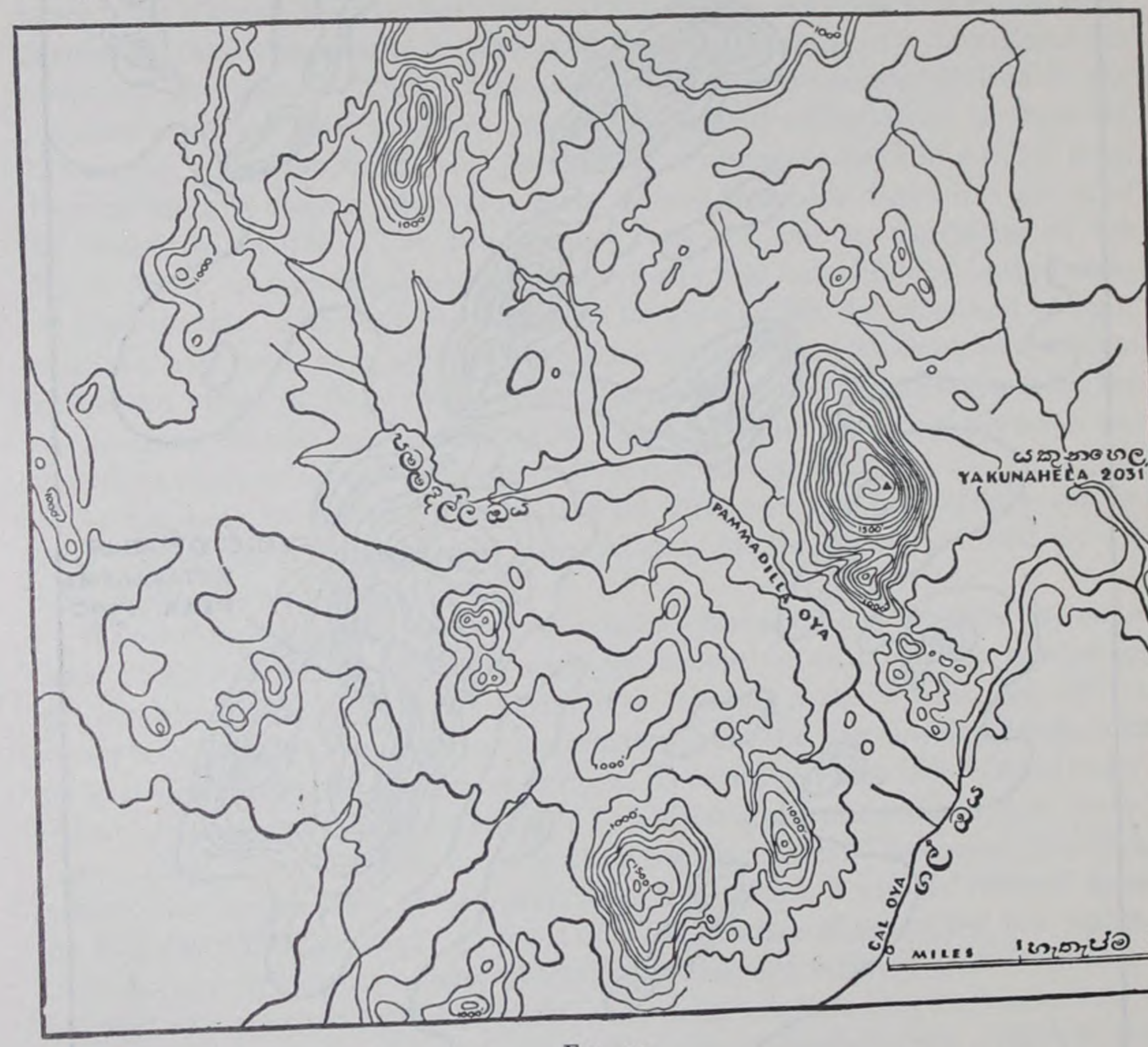


FIG. 30.

Contoured Map of Kataragama Peak and other low hills projecting from the almost flat deposits of the lowlands.

clothed with wet jungle and has never been cleared or cultivated ; it presents an appearance of wild natural beauty.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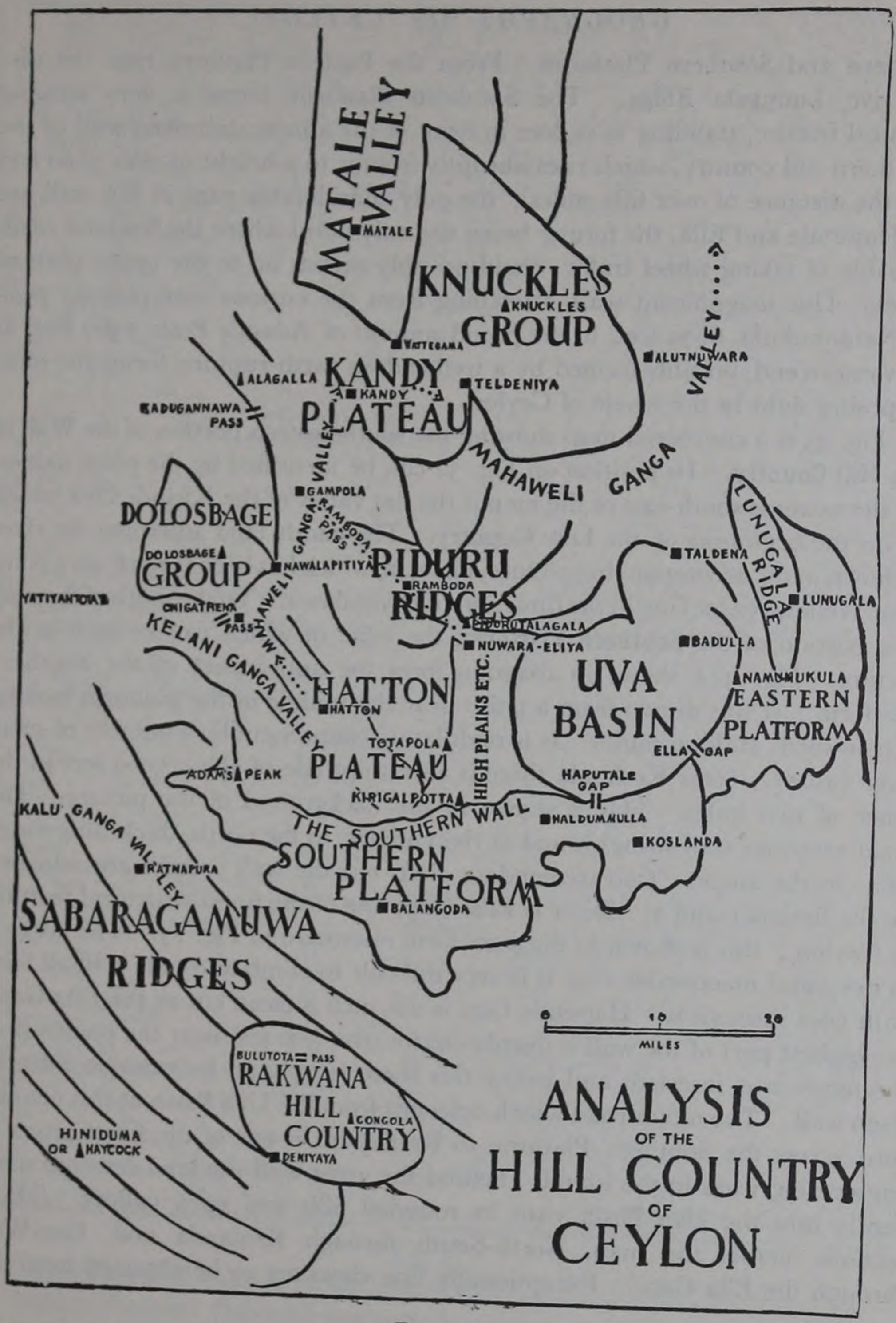

MATALE VALLEY
MATALE
KNUCKLES
KNUCKLES GROUP
VATTEGAMA
ALUTNUWARA
VALLEY
ALAGALLA
KANDY
KANDY
TELDENIYA
KADUGANNAWA PASS
PLATEAU
MAHAWELI GANGA
GAMPOLA
DOLOSBAGE
DOLOSBAGE
GROUP
NAWALAPITIYA
RAMBODA PASS
PIDURU
RIDGES
RAMBODA
TALDENA
LUNUGALA RIDGE
LUNUGALA
YATIYANTOTA
PASS
KELANI GANGA VALLEY
HATTON
HATTON
TOTAPOLA
PLATEAU
HIGH PLAINS ETC.
NUWARA-ELIYA
BADULLA
UVA BASIN
NAMUNUKULA
EASTERN PLATFORM
ELLA GAP
ADAMS PEAK
HAPUTALE GAP
KIRIGALPOTTA
THE SOUTHERN WALL
HALDUMMULLA
KOSLANDA
KALU GANGA VALLEY
RATNAPURA
SOUTHERN PLATFORM
BALANGODA
SABARAGAMUWA RIDGES
0
10
20
MILES
BULUTOTA PASS
RAKWANA HILL COUNTRY
GONGOLA
DENIYAYA
HINIDUMA OR HAYCOCK
ANALYSIS
OF THE
HILL COUNTRY
OF
CEYLON

FIG. 32.

Eastern and Southern Platforms. From the Eastern Platform rises the distinctive **Lunugala Ridge.** The Southern Platform forms a very striking natural feature, standing as it does in front of the almost unbroken wall of the southern hill country, which rises abruptly from it to a height of over 5000 feet for the distance of over fifty miles ; the only considerable gaps in this wall are at Haputale and Ella, the former being the only point where the lowland road, capable of taking wheel traffic, could possibly mount on to the upper plateau level. This magnificent wall, stretching from the curious nine-pointed peak of Namunukula, 6679 feet, to the proud summit of Adam's Peak, 7360 feet, at its western end, possibly formed by a tremendous earth-rupture, forms the most imposing sight in the whole of Ceylon.

Fig. 33 is a contoured map showing the south-eastern portion of the **Wall of the Hill Country.** Its position on Fig. 32 can be identified by the place names. In the extreme south-east of the map is the flat valley of the Kirindi Oya which forms the beginning of the Low Country. The paddy land adjoining the river is shown in the accompanying picture, Fig. 34B, which has been taken from a point near Wellawaya looking in the direction of Diyatalawa. To the south of the map is a portion of the **Southern Platform,** the edge of which can be seen in the picture. Fig. 34A shows in diagram form the appearance of the Southern Platform ; it was drawn from a point near the middle of the platform looking east towards Haldummulla. It is undulating country cut by a number of small river valleys. Near Koslanda there is an abrupt rise of about 3000 feet in the space of two miles. This is shown in the background of the picture. The great east-west wall swings round at right angles, to the north, thickening somewhat in the angle. Two tremendous clefts cut the wall ; these are indicated by the figures 1 and 2. No. 1 is Ella Gap, one of the finest structural features in Ceylon ; this is shown in diagram form elsewhere in Fig. 27. The gorge is so deep and inaccessible that it is very difficult to climb and only a small footpath goes through it. Haputale Gap is not such a clean cut as the Ella Gap ; the highest part of the wall is deeply cut for over 500 feet near the point where the figure 2 is inserted, and below this there is only an indentation into the steep wall. The motor road which descends from the Uva Basin at this cut and runs across the Southern Platform to Ratnapura is one of the finest pieces of engineering work in the island. Behind the great wall the land descends more gently into the Uva Basin with its rounded hills and open valleys. (Make sections across the map, North-South through Koslanda and East-West through the Ella Gap.) Exceptionally fine views are to be obtained from the

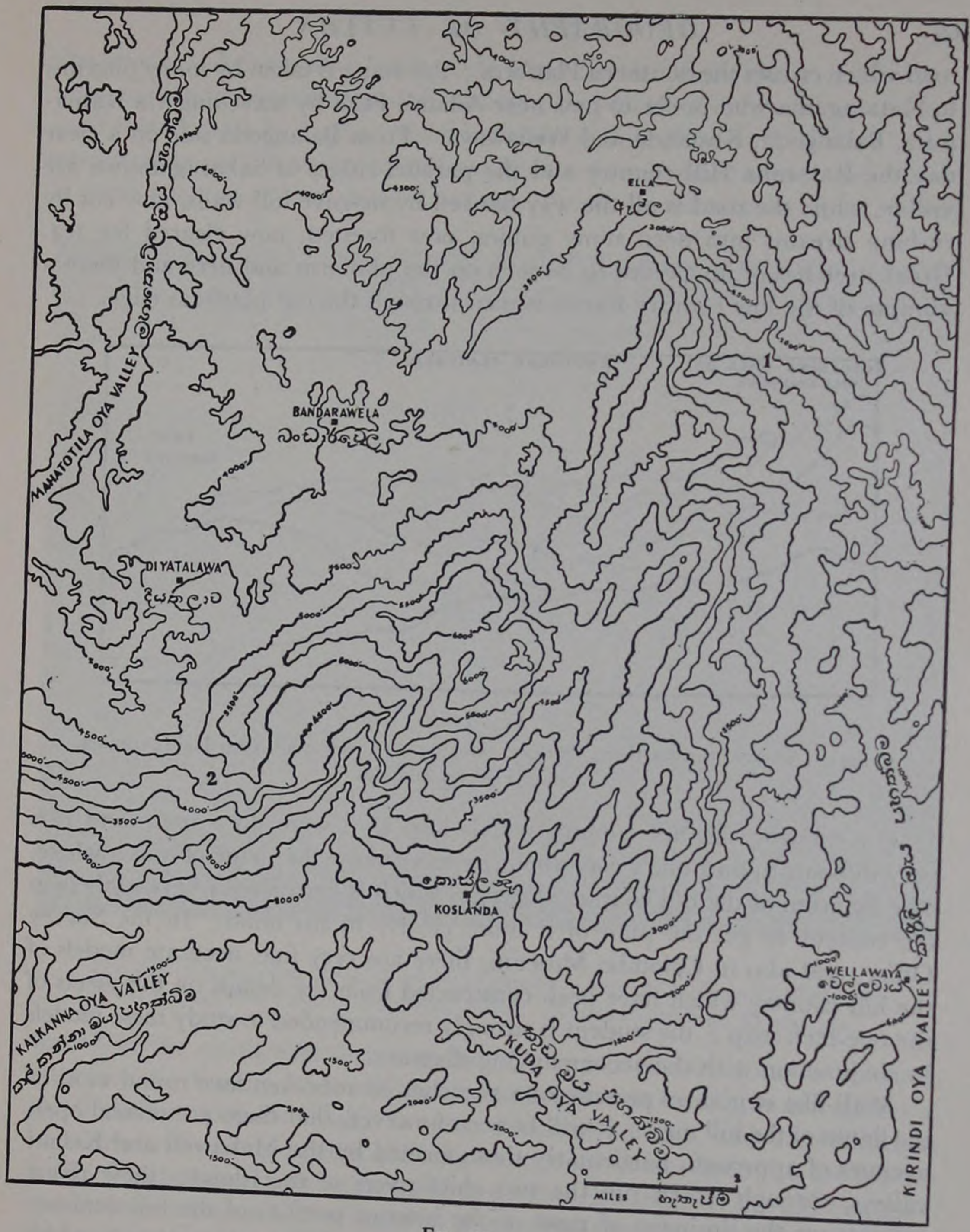


FIG. 33.

Contoured Map of the S.E. Corner of the Hill Country and part of the Uva Basin and Southern Platform. Colour this map on the layer system, so as to show up the principal features. 1 = Ella Gap (see Fig. 27). 2 = Haputale Gap. Compare Figs. 34A and 34B.

road which crosses the Southern Platform ; this route is taken by many pilgrims to Kataragama who prefer to pass near Adam's Peak by travelling via Ratnapura, Balangoda, Koslanda and Wellawaya. From Balangoda side on a clear day the Rakwana Hill country and the parallel ridges of Sabaragamuwa are visible, while the road is all the way flanked by massive hill walls, now cut by rushing streams into deep stony gullies, now forested, now cleared for tea. Great stretches of jungle are to be seen on the platform and here and there a glimpse of the low country forests is seen through the cut platform edge.

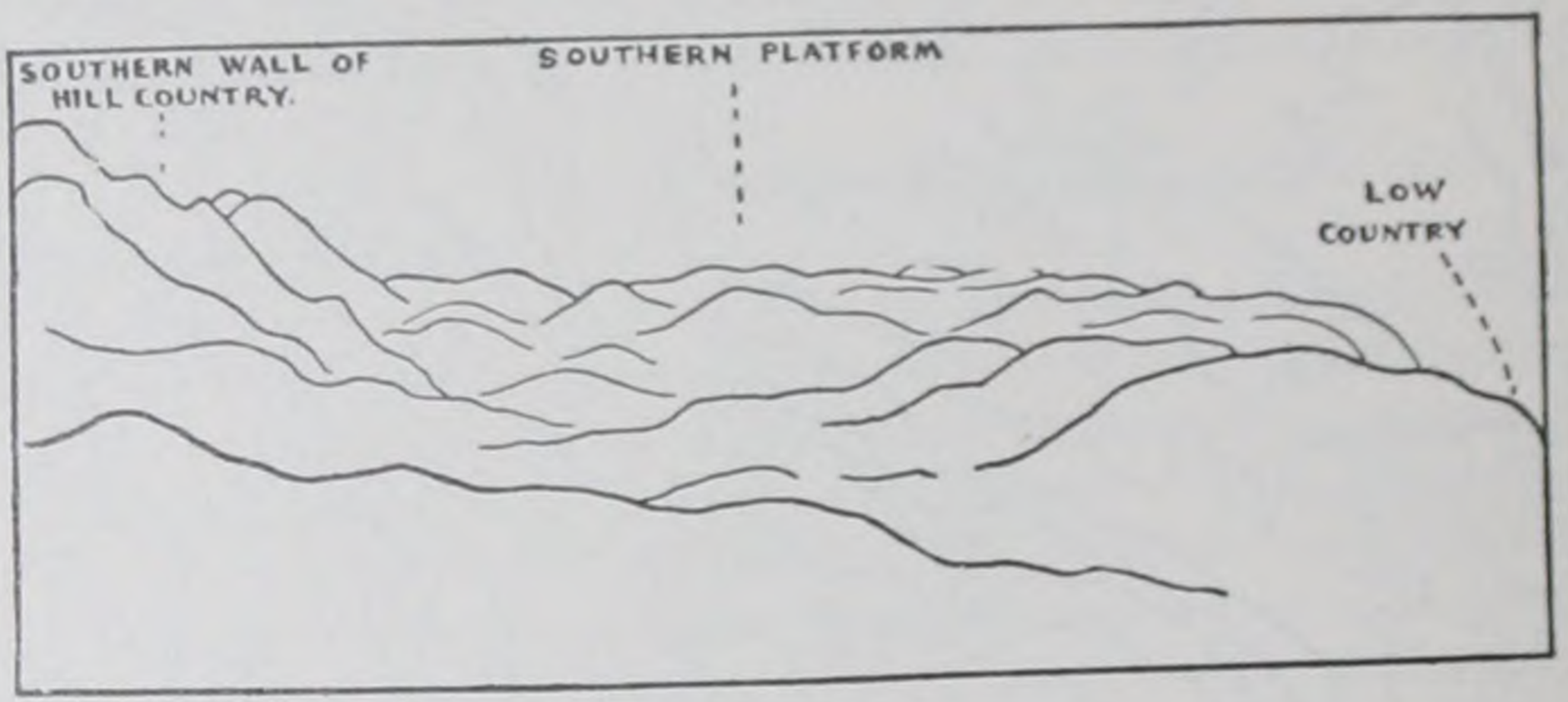


FIG. 34A.

Diagram View of the Southern Platform, looking east from a hill near Haldummulla.
Compare Figs. 33 and 34B.

On entering the hill country one is lost, as it were, in a maze and it is very difficult to find one's way about or to visualise the shape of it as a whole. The diagram of the hill country (Fig. 32), which is here given will possibly help the student to get the plan of it more clearly in his mind. In the Survey Office, and also in Colombo Museum, there are very fine, accurate models of the hill country which have been constructed from the details on the sheets of the one-inch map ; the student is strongly recommended to study these models in conjunction with the accompanying diagram.

Wall-like structures present long stretches of unbroken face round most of the flanks of the hill mass : it will be seen however, that there are several open avenues of approach, particularly those formed by the Mahaweli and Kelani valleys, through which run the two chief rivers of the island ; these rivers connect up the drainage of most of the interior portion of the hill country. We can see from this diagram why Alutnuwara and Sitawaka (represented by

the modern Avissawella) were such important strategic points in ancient history. The northern approach through the Matale Valley is an open road, until it is blocked by a ridge which separates it from the Kandy Plateau. The road passing up this valley has always been a very important one, and played a great part in ancient history because the early inhabitants were mainly

FIG. 34B.
The S.W. Corner of the Wall of the Hill Country. Part of Southern Platform and flat land of Low Country near Wellawaya. Compare with Figs. 33 and 34A.

settled in the north and therefore fled to the hill fortress from its northern approaches. Kandy, whose English name is doubtless a simple corruption of the Sinhalese word for "hill," became the great hill city, and maintained its importance for a long period, not only on account of its relation to the Matale Valley but because it also controlled two other entrances to the hill fortress—the Mahaweli Ganga Valley and that tremendous cleft called the Kadugannawa Pass, which led in the direction of Colombo, a favourite landing place for the

invading armies. Gampola, which was also used for a short time as capital had somewhat the same advantages as Kandy, but was more remote from the inhabited north and had the additional advantage of a connection with two important passes—the Ginigathena Pass leading into the Kelani Valley, and the Ramboda Pass, which led into the impregnable fastnesses of the Piduru Ridges, and finally towards the Uva Basin.

It is somewhat difficult, on account of its great complexity, to divide up the hill country in an intelligible manner so that the student may gain a clear idea of its configuration. The diagram is only intended to be suggestive, and should be supplemented by detailed study in the field. There are over 150 mountains between 3000 and 7000 feet in height, as well as twelve peaks between 7000 and 8200 feet. The highest, though not by any means the most imposing peak (it only rises about 2000 feet from a plateau which is already at the 6000 foot level), is Pidurutalagala, 8292 feet high, whose name in English geography books is often corrupted to "Pedrotalagala," or simply "Pedro." Most of the highest points are situated either near this peak or along the southern hill wall. Of the other mountains, apart from Adam's Peak, the best known are Kirigalpotta, 7857 feet, and Totapola, 7741 feet, which can easily be seen from the main road or railway in the neighbourhood of Ohiya. Though much lower in height, there are several somewhat striking peaks which are bound to be noticed by any traveller in the hill country: Knuckles Group, so called by the English from its resemblance to the knuckles of a hand, whose highest point exceeds 6000 feet; Alagalla, that dark and gloomy rock overlooking the railway on the Kandy line as it enters the hill country; and further up the line in the neighbourhood of the Kadugannuwa Pass, the Bible Rock, the broken portion of a band in the gneiss, having the appearance of a large book; Dolosbage also is an outstanding peak in the mountain group adjoining Nawalapitiya; Hakgala

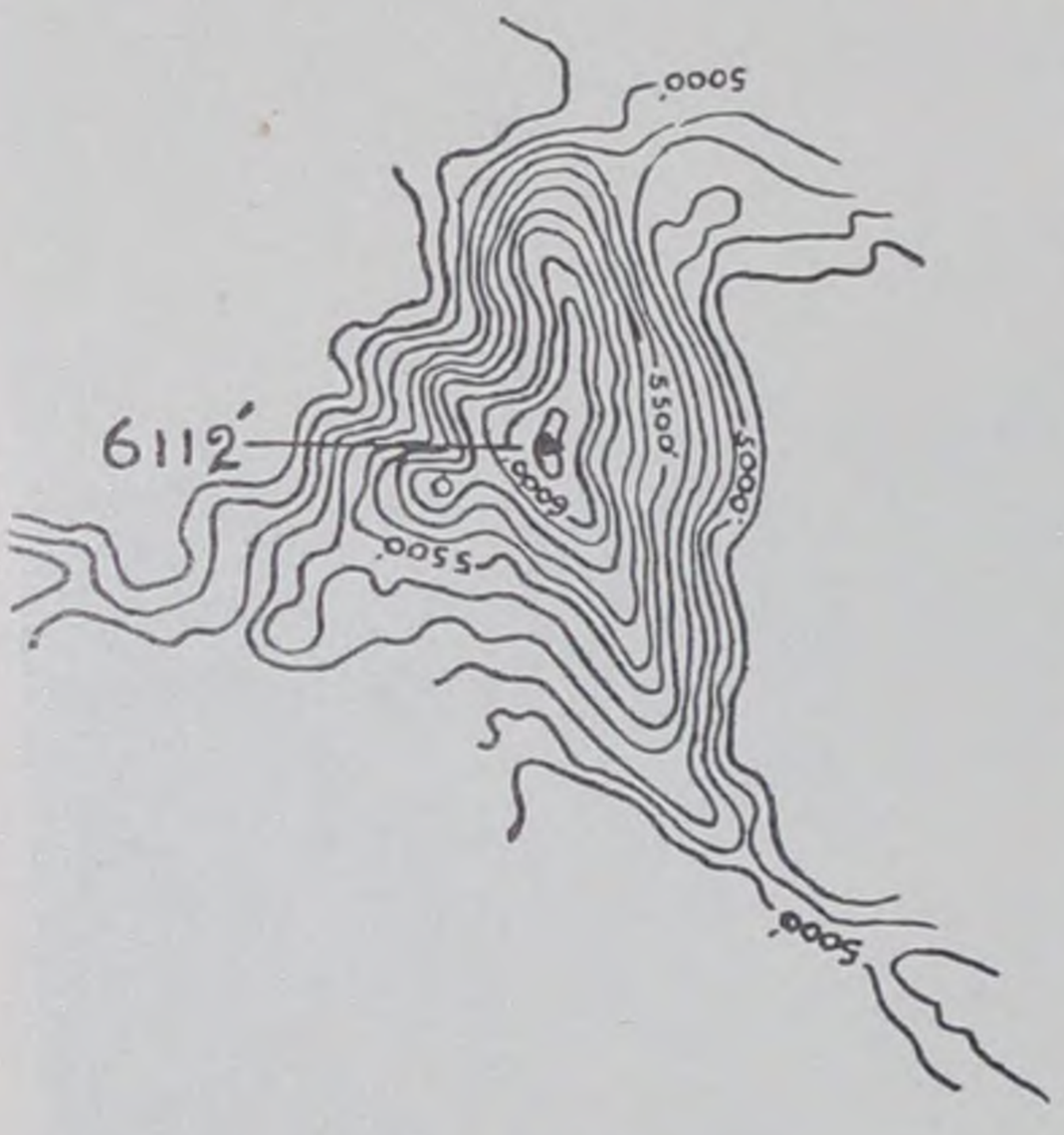


FIG. 35.
Contours of Knuckles Peak. Scale 1 inch to 1 mile.

presents a nearly vertical massive rock face and is well known to all visitors to Nuwara Eliya.

The distinctive plateau areas having a considerable amount of land at the same level, are, in order of average height, as follows :

(*a*) The series of high plains between Piduru and Kirigalpotta, an open and bare plateau land, known in various parts as the Horton Plains, the Moon

FIG. 36.

Part of the Knuckles Group.

Plains, the Wilson Plains, and the Nuwara Eliya Plains, rising in certain parts to a height of over 7000 feet.

(*b*) The **Hatton Plateau,** a much more broken area, whose average height is between 3000 and 4000 feet, cut up by a series of parallel ridges having the same direction as the adjacent ridges of Sabaragamuwa, and directing the river system into the same parallel lines ; the rivers of these parallel ridges unite to form the Mahaweli Ganga. A good view of the region can be obtained from the Duke's Nose, near Hatton.

(*c*) The **Uva Basin**, average height 3000 feet, an area of very striking configuration ; it is surrounded on three sides by an almost unbroken wall, and cut up in the north by two considerable streams, the Badulla and Uma Oyas, which collect the drainage of the basin and find their way out in deep valleys which finally reach the Mahaweli Ganga. At its eastern side, like a great sentinel, stands the remarkable nine pointed peak of Namunukula, from the slopes of which an excellent view of the Basin can be seen ; a very good view

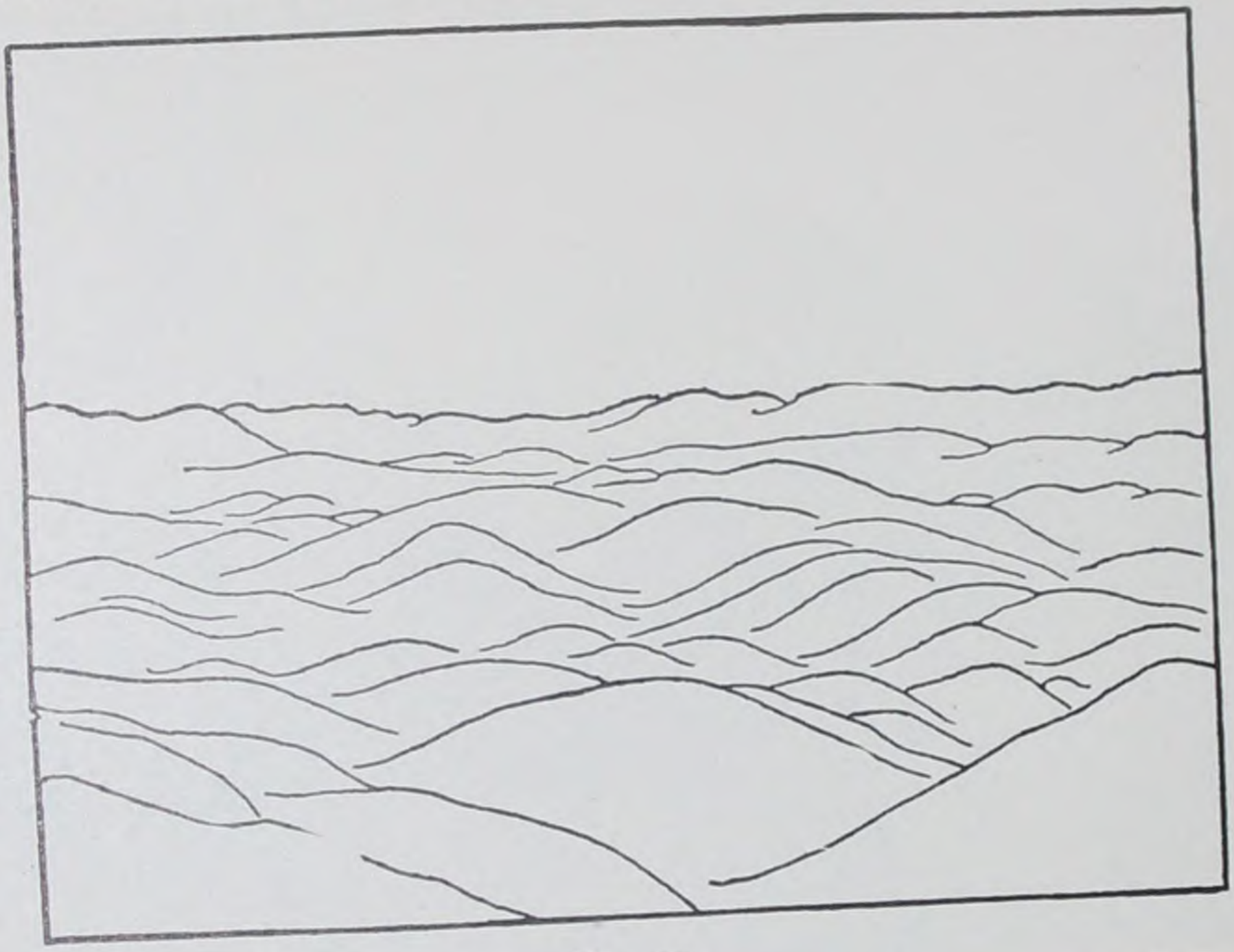


FIG. 37.

Diagram of Part of the Uva Downs. Note the numerous low, rounded hills.

of it can also be obtained when travelling on the railway between Patipola and Haputale ; the Uva Basin is one of the most distinctive areas in Ceylon, partly on account of the fact that it is covered by the grass-lands called " patanas," instead of forest. The hills of the middle of the Basin are generally called the Uva Downs, on account of their resemblance to the open grass-covered hills called " downs " in England. They present a remarkable appearance, a velvety undulating surface with rounded hills and depressions. The map on page 91 is not sufficiently detailed to show the smaller hills, which are extremely numerous and rise to levels between the contours which are at intervals of 500 feet.

(*d*) The **Kandy Plateau**, a broken and much less distinctive area, but possessing a certain amount of centrality; its average height is between 2000 and 3000 feet, and like the Hatton Plateau it is much cut up by peaks and ridges. The well-known peak of Huntane, standing above the Kandy Lake, is certainly worth climbing in order to get a view of the whole plateau. It is cut by the Mahaweli Ganga on the west and south and on the east is the open stretch of country called the Dumbara Valley.

Means of communication in the hill country have always been few and difficult. In the ancient days they were mere tracks, and in many areas, even at the present time, there is nothing more than these old tracks, and in some parts, no roads at all. Reference has already been made to the chief entrances to the hill country. Since the British Occupation the great work has been accomplished of connecting these many entrances and also of connecting the separate sections one with the other by a very fine series of roads. The main line of communication follows the Mahaweli Ganga Valley from Kandy to Hatton, crosses the high plains and connects the Hatton Plateau with the Uva Basin. One of the greatest feats of engineering was the construction of a magnificent road cut into the sides of the Ramboda Pass. Apart from the ordinary movement of people and goods in the hill country, certain ancient roads connected with the old pilgrim routes have always been of great importance. Adam's Peak has for centuries been one of the most noted places of pilgrimage in the whole of Asia, on account of its traditional association with the life of Buddha. The ancient approaches to the peak are still in use; the more easy climb is made by following the Mahaweli Ganga to near its source, crossing the parallel ridges of the Hatton Plateau to Maskeliya, and approaching it on the east. The most meritorious route, on account of its extreme difficulty and discomfort, is the western approach from the low country, by Ratnapura, and involves scaling of the steep, outer wall of the hill country and passing through some of the wettest of the forests. The so-called "footprint" on Adam's Peak is an indentation bearing some slight resemblance to a human footprint, but which, having a length of about four feet, must presumably be that of a giant. For some reason which is lost in antiquity this peak has become surrounded with a cloak of interesting legend, connected not only with Buddhism but with all the great religions of the Indian area. Apart from its religious significance, its great beauty, which resembles that of the Matterhorn in the Alps, must always make it an object of veneration to all who have the opportunity of seeing it. It has been described in terms of the highest praise

by many travellers, never perhaps more quaintly than by John de Marignolli, the Italian monk, who thought that possibly on its slopes "Paradise itself exists." He refers to it in the following words: "That exceeding high mountain hath a pinnacle of surpassing height which on account of the clouds can rarely be seen." A more modern description, by Henry Cave, a great lover of Ceylon, and possibly the only person who has ever made a good photograph of the shadow of the Peak at dawn, is also of exceptional interest.

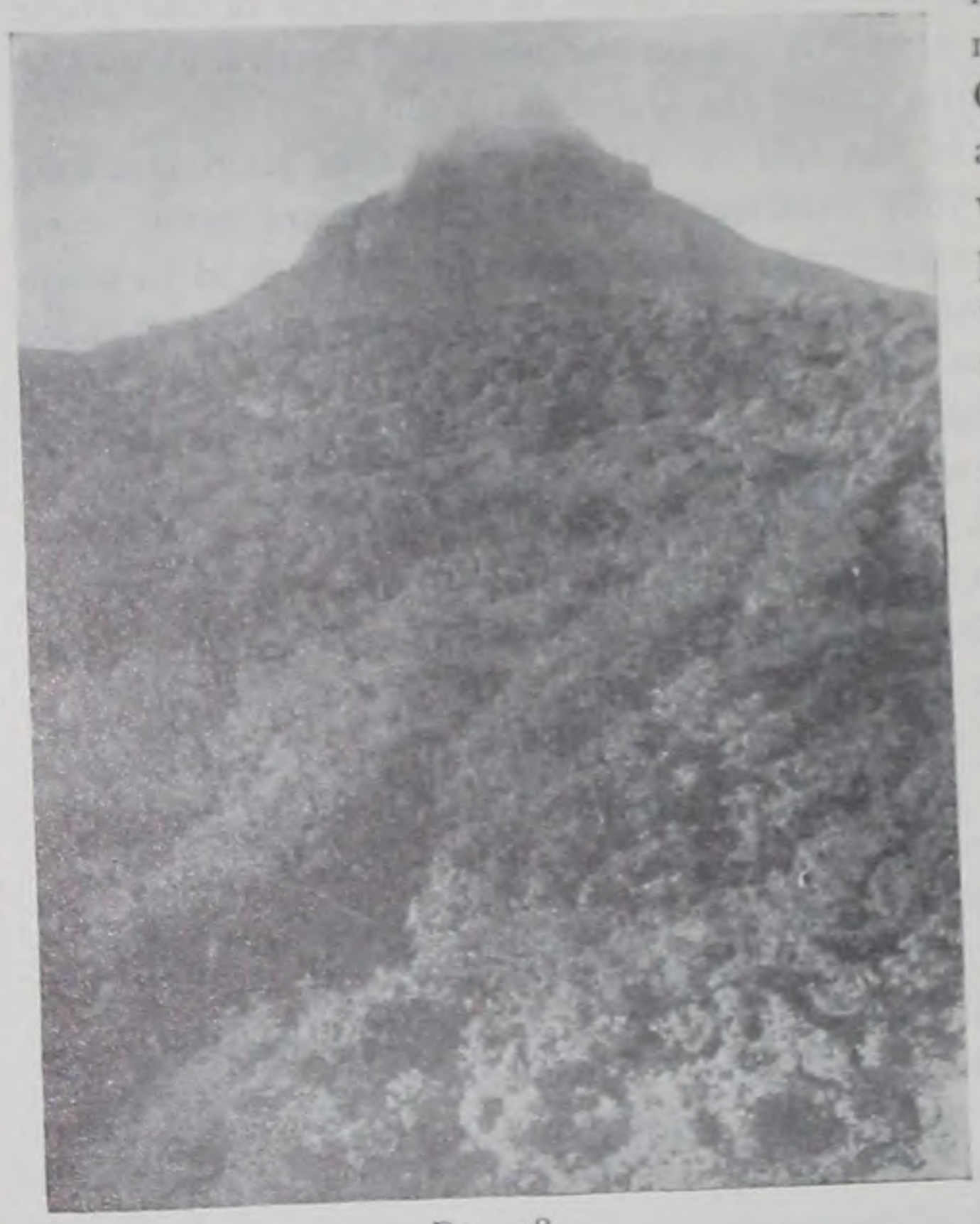


FIG. 38.

The Summit of Adam's Peak from the Maskeliya side. Note the dense forests, which gradually thin out and are replaced by coarse grasses, etc., for about the last 1500 ft.

"Under peculiar atmospheric conditions that frequently present themselves the curious phenomenon known as the Shadow of Adam's Peak is observable at dawn from the summit of the mountain. The first faint beams reveal the fleecy shroud of mist covering the world below, and as the welling light grows clearer, up rises the mighty shadow. Like a distant pyramid it stands for many seconds; then nearer and nearer, ever increasing in size and distinctness as the rays of light broaden over the horizon, it advances towards us like a veil, through which the distant mountain forests and plains are distinctly visible, till at length it seems to merge in its mighty parent and instantly vanish.

"It may be said without fear of contradiction, that among all the mountains in the world invested by tradition with superstitious veneration none has stirred the emotions of so many of our fellow-subjects as Adam's Peak. The

origin of its sacred character, involved at once as it is in the legendary history of several ancient religions, has been the subject of considerable research and greater conjecture.

"There is no doubt that the legends take their rise in the mark on the summit resembling the impress of a gigantic human foot. This the Buddhists devoutly worship as the sacred footprint of Gautama, while the Hindus equally claim it as that of Siva, and the Mahommedans, borrowing their history from the Jews, as that of Adam. Thus do the adherents of three great religions, to the number of 800,000,000 of our fellow-creatures, vie with one another in veneration of the lonely Peak. As in pilgrim bands they ascend the mighty cone their hearts are moved and they regard its rugged paths as steps unto heaven. From all parts of Asia thousands annually flock up the steep and rugged track, enduring privation and hardship for the good of their souls."

"No other mountain," wrote Sir Emerson Tennent, "presents the same unobstructed view over land and sea. Around it to the north and east the traveller looks down on the zone of lofty hills that encircle the Kandyan kingdom, whilst to the westward the eye is carried far over undulated plains, threaded with rivers like cords of silver, till in the purple distance the glitter of the sunbeams on the sea marks the line of the Indian Ocean."

PART II. CHAPTER 5

THE CLIMATE OF CEYLON

Introduction

The facts relating to the climate of Ceylon are collected by observers all over the country, whose work is organised by the Government. This work was commenced about seventy-five years ago, and has gradually been improved, until at the present day there are sixteen observing stations, including a large observatory at Colombo, supported by the Government, in which records of rainfall, temperature, pressure, humidity, and wind, are taken for every day in the year, while about three hundred and fifty people, many of whom are on estates, take regular rainfall readings, which they send in to the Superintendent of Colombo Observatory. The sixteen observing stations are shown in the accompanying map. The Superintendent of Colombo Observatory is responsible for collecting all the observations, and publishing them in a report every year. He is also responsible for the study of these collected observations, so that rainfall and temperature maps can be made and conclusions can be formulated as to what exactly occurs from day to day in the atmosphere above Ceylon. He and his staff produce from time to time bulletins announcing the conclusions at which they have arrived and stating what they think are the causes of the various phenomena which have been observed. Apart from the yearly report, the most useful works for the student to consult are as follows :

1. *Bulletin No. 3*, on Ceylon Rainfall, which contains a series of maps showing the averages for each month of the year.
2. *Bulletin No. 4*, on the General Circulation of the Air over Ceylon, with special reference to the Time of Day of Rainfall.
3. *The Ceylon Journal of Science*, Section E, Volume I, Part 1, " Cyclonic Movements in Ceylon," and Part 3, " Notes on the Climate of Western Ceylon."

All the new Bulletins are now published in Section E of the *Ceylon Journal of Science*.

Climate records are most valuable when they extend over a great number

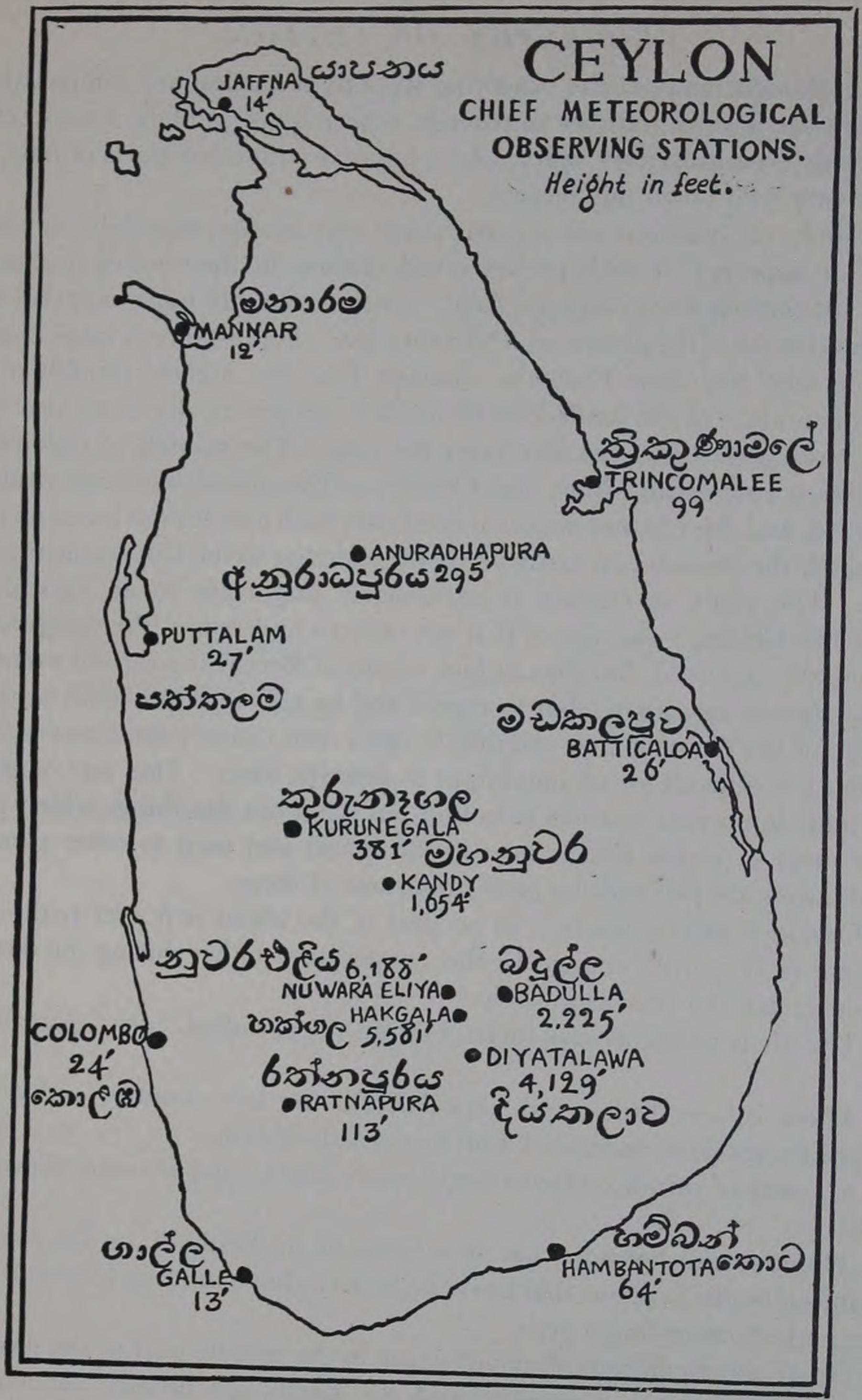

CEYLON
CHIEF METEOROLOGICAL OBSERVING STATIONS.
Height in feet.
JAFFNA
14'
යාපනය
මන්නාරම
MANNAR
12'
ANURADHAPURA
අනුරාධපුරය 295'
PUTTALAM
27'
පත්තලම
ත්‍රිකුණාමලේ
TRINCOMALEE
99
මඩකලපුව
BATTICALOA
26'
කුරුනෑගල
KURUNEGALA
381'
මහනුවර
KANDY
1,654'
නුවරඑළිය 6,188'
NUWARA ELIYA
හක්ගල HAKGALA 5,581'
බදුල්ල
BADULLA
2,225'
COLOMBO
24'
කොළඹ
DIYATALAWA
4,129'
දියතලාව
රත්නපුරය
RATNAPURA
113'
ගාල්ල
GALLE
13'
හම්බන්තොට
HAMBANTOTA
64'

FIG. 39

of years ; though many of the observing stations of Ceylon are comparatively new, there are a large number of records, especially of rainfall, which extend over periods exceeding sixty years. As compared with other parts of Asia, the island is very well off in this respect.

The study of climate is not a particularly easy matter, especially as people are apt to approach it with preconceived notions in their minds instead of making conclusions from observed facts. They frequently make mistakes even about the climate of the district in which they live. For instance, a large number of people who live near Colombo imagine that the highest rainfall occurs during the middle of the south-west monsoon ; yet practically in no year since records have been taken has this been the case. The rainfall of Colombo is greatest as a rule during May and October. The actual facts can easily be ascertained, and this chapter concerns itself only with conclusions based on those facts, which the student can easily verify by referring to the Government publications. The study of climate is particularly important to an agricultural country like Ceylon ; the aim of it is not only to understand the things which have actually occurred, but also to find means of forecasting certain events, so that the planter may learn what to expect and be able to improve his work.

Many of the climatic facts relating to one's own country seem so very ordinary that it is difficult for an inhabitant to describe them. One way of getting at the most important features is to find out what are the things which particularly strike a person who is new to the island and used to other climates. The following are perhaps the most important of these :

1. Ceylon is always warm ; in no part of the island is it ever really cold, and there is very little change in the temperature either during the day and night or during the year as a whole.

2. The air is nearly always moist, even in the so-called "dry" parts of the island.

3. There is very little wind, especially in the low country, and a great number of calm days associated with heavy falls of rain.

4. Showers of rain are often exceptionally heavy, and it comes down very straight.

5. Thunder and lightning are very frequent (in England, on the contrary, it not infrequently happens that quite large areas have no thunderstorms at all during periods exceeding a year).

6. Great accumulations of clouds occur in the middle part of the day, rain is frequent in the late afternoon, and the nights are usually uncommonly

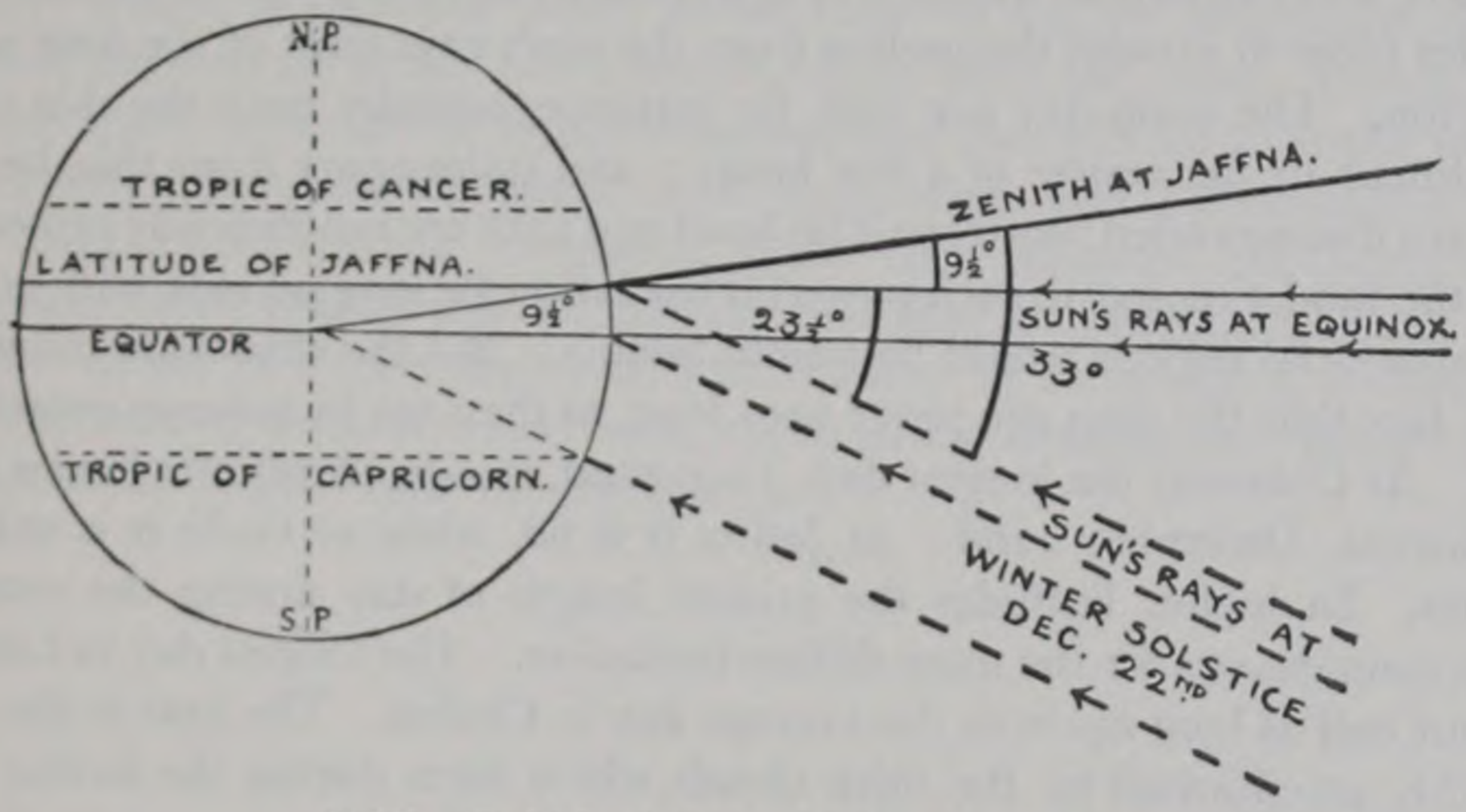
clear ; for instance, to get a view from the top of a mountain, it is almost useless to go up between the hours of about 11 a.m. and 5 p.m. In spite of the cloudiness, however, fog or mist seldom occurs near the surface on the lowlands.

7. There are no well-marked seasonal changes, *i.e.* it is impossible to divide the year, as in the Temperate Zone, into spring, summer, autumn and winter.

A knowledge of these facts will help us to see what we have to explain in a more detailed study of the climate, to which we will now proceed.

Effects of Latitude

Ceylon is situated on the northern edge of a belt or zone which is commonly known as the Belt of Calms or the Doldrums. It lies along the Equator, and



MID-DAY SUN AT JAFFNA

Fig. 40.

extends to about 10° north and south. Galle is at 6° north, while Jaffna is at about 9½° north. In this belt the sun's rays always strike the earth at a high angle, and are therefore relatively concentrated on any given area. The greatest number of rays come in contact with any unit of surface when the sun is vertically overhead, and as it is in this position twice during the year in Ceylon, the sun's rays are always very intense. The sun can never be at midday lower than 57° above the horizon. Fig. 40 shows its position in relation to Jaffna at the winter solstice, when it is overhead at noon on the Tropic of

Capricorn $23\frac{1}{2}^\circ$ south. It is then approximately $9\frac{1}{2}^\circ + 23\frac{1}{2}^\circ = 33^\circ$ from the zenith at Jaffna ; that is, at an altitude of $90^\circ - 33^\circ = 57^\circ$ above the horizon, which is the lowest point it can ever occupy at noon. This must be compared with corresponding figures for the lands further north ; for instance, in the latitude of London the sun only attains a height of 15° above the horizon on mid-winter day at noon.

The sun is directly overhead at noon at Colombo on April 8th and September 5th, and for a considerable period before and after these two dates the rays are very nearly vertical.

The intensity of insolation[1] in Ceylon is one of the most important controlling factors in the climate. It makes growth very rapid, and has very important effects upon human life. The people of the island have become used to it, and can expose themselves to it quite freely, but people from northern latitudes have to protect themselves from the sun's rays most of the time when in Ceylon. The noon-day sun will, for instance, actually burn the skin of an Englishman in the course of a few hours ; and quite apart from this, he will develop a disease called sunstroke if his head and neck are insufficiently protected. Were the land exposed to such powerful insolation for long periods, with no respite, equatorial regions would be uninhabitable. But the effects are mitigated by the fact that the days are never very long, as they are in summer nearer the Poles. At Colombo the longest day, June 22nd, is only 48 minutes longer than the shortest, December 22nd ; at Jaffna it is 68, while at Galle it is only 42 minutes. In higher latitudes the greater length of day during the summer partly compensates for the more diffuse insolation. The longest day in London is about half as long again as the average day in Ceylon. The heat is also considerably ameliorated by the thick clouds which form during the hottest part of the day ; these interfere with the transmission of radiant energy in the air and protect the land very considerably. Indeed, the hottest parts of the world are not actually the nearest to the Equator, because for other reasons the equatorial regions are moist ; the highest temperatures and the most intense light are generally found in the driest regions where radiant energy is transmitted most rapidly. The reasons why the equatorial regions have only slight seasonal variations and almost equal day and night are usually quite sufficiently explained in text-books of general geography. It will be sufficient here to give a short summary of the facts. If the earth's axis were at right angles to the

[1] Insolation = total radiant energy received from the sun, including light, heat, chemically active rays, etc.

Ecliptic (*i.e.* the plane of the earth's path round the sun), there would be no seasonal variations on the earth, and day and night would be equal everywhere. It is, however, tilted $23\frac{1}{2}^{\circ}$ from this position, and the only place where there is any approximation to these conditions is at the Equator, *i.e.* at the point where the earth is cut by the Ecliptic, which must always be through the plane in which the Equator lies ; for along a line in this plane at any one moment there is no tilting. As the earth rotates, every point on the Equator comes into this line during the course of the day, and this happens all the year round, irrespective of the placing of the earth in relation to the sun. This half-way line also cuts the earth at its greatest circumference into two exact halves, one of which is in light and the other in darkness at any particular moment. As we move from the Equator towards the Poles the seasonal changes become greater, and the relative length of day and night, which depends on the proportion of each latitude circle lit up at any one moment, varies more and more. Within about 10° north and south of the Equator the seasonal changes are so slight, as compared with those of the Temperate and Frigid Zones, that it is customary to say that there are no seasons. Similarly, in the same latitudes, the length of day and night varies so little that we may say that they are practically equal.

The climate of Ceylon is primarily determined by its situation, and some of the more striking features which bring it into strong contrast with other regions are due to its position near the equator.

PART II. CHAPTER 6

WINDS

CEYLON is situated in the Equatorial Belt of Calms and on the edge of the Indian Monsoon system. The former exerts the more fundamental influence on its climate and the latter is to be regarded as a factor which strongly modifies the climate at certain periods of the year. So erroneous are popular notions concerning the importance of monsoons that the student is advised to divest himself of all these ideas and make his conclusions from the study of actual observations. It may occasion some surprise that the monsoon winds were not included in the list of climatic phenomena which most impress a visitor to the island. Yet it is indeed the case that the calms and not the winds claim the attention of people from other latitudes. Observations of the direction and strength of atmospheric movement have been made for a considerable period and these tend to establish the following facts :

1. On the whole calms are more frequent than winds, and vastly more frequent than in countries outside the belt of calms.

2. The pressure gradients across Ceylon are seldom remarkably great and often very slight. The strength of the wind depends on the rate of change of pressure between one place and another (this is called the pressure gradient). If the pressure at Trincomalee is a great deal lower than that at Colombo, a strong wind would set in towards Trincomalee, while if the difference is only slight the movement would also be slight. In more northerly latitudes the wind blows more along the isobars (=equal pressure lines) but in Ceylon it is usually nearly at right angles to the isobars. "Gale force" according to the international system of records (40 mls. per hr.) is seldom attained owing to the prevalence of low gradients.

3. High wind velocities are infrequent, especially in the low country. They do occur in the upper layers of the air and hence are felt amongst ridges of the hill country (actually in the Ohiya Gap, higher velocities have been recorded than in England, but this is exceptional).

On the whole the wind is felt most in Ceylon in the high hill edges and along the coasts. The former winds are frequently connected with the monsoon circulation. The coastal winds are characteristic of hot countries owing to the fact that the circulatory system known as "land and sea breezes" is strongly developed. On the lowlands it often only extends a few miles inland; a strong wind will be felt along the shore when the usual calms prevail elsewhere. Land conducts heat more quickly than water and hence is both heated and cooled more rapidly. The same amount of heat from the sun will raise the temperature of the land more than half as much again as the sea. The air above each varies correspondingly, so that during the day when the land becomes strongly heated the air above it tends to rise, while that above the cooler sea, flows inwards to take its place. During the daytime therefore a sea breeze will occur along the coast, increasing in intensity with the difference in temperature between the land and sea air. At night the process is reversed, as the land cools more quickly than the water, and a land breeze is formed. The difference between the temperature of the land and sea is much greater in the tropics than in the temperate zone; hence the land and sea breezes are usually more strongly marked in the former than in the latter. The ameliorating influence of the sea breezes has no doubt caused many people to build their houses close to the sea. The strength of the breeze at certain times of the year, however, makes them turn their backs to the sea and open windows inland. A continuous series of settlements line the coasts everywhere except in the unpopulated jungle areas. There are, of course, many other reasons for settling along the coast, but this, no doubt, is an important factor.

Before proceeding to examine the monsoon winds, let us analyse more closely what is actually taking place on these very striking days of calm in Ceylon. Air, in common with all fluids, is heated from the bottom upwards. The air in contact with the earth's surface is first heated, and this makes it expand, causing it to rise; as it rises, cooler air comes down to take its place. The sun's rays appear to affect the air very little until they have been absorbed by the earth and radiated out to heat the lower layers. Provided that there is no great disturbing factor, like a strong wind, the tendency therefore will be for up and down currents to form in the air. These are called convection currents; they are, of course, much stronger on days of greater heat. It seems therefore that on the days of so-called calm the air is far from being motionless; it is, on the contrary, full of movement, but of a sort to which we are not particularly sensitive. When the movement of the air is making an angle

with the body we say there is a wind ; when it is in the same straight line we call it a calm. This **convectional circulation** is the normal course of events in the belt of land nearest to the overhead sun, and is hence a daily occurrence in the Belt of Calms. Convectional circulation is, therefore, a basic influence in Ceylon climate, and always tends to assert itself unless there is any strong disturbing factor. The chief disturbing factor is, of course, the monsoon winds of the Indian area, on the outer edge of which the island lies.

During recent years a large amount of important climatic data relating to the monsoons has been collected in the Indian area. These data are gradually being classified and studied, so that inferences may be drawn which will give a clearer notion of what is actually happening in the atmosphere in this region. It will naturally be a long time before it is all sorted out ; meantime, the meteorologists in India have come to certain conclusions which considerably help us to understand what is going on. One of the most helpful short works which may be of use to the student, as it summarises many of the newer ideas on monsoon circulation, is an article entitled " The South-West Monsoon " in the *Quarterly Journal of the Royal Meteorological Society*, London, July, 1921 (Vol. XLVII, No. 199), by Dr. G. C. Simpson, C.B., F.R.S. It is not within the purpose of this book to give such an exhaustive account of the monsoons as rightly belongs to a treatise on India, but as at the time of writing there are few ordinary text-books which treat the subject adequately, especially from the point of view of Ceylon, rather more information is here given. The reader is advised, however, at this point, to read the section on Monsoons in any text-book of general geography. The simple explanation which is offered in most of these works is, of course, very generalised, and only gives the broad principles. The monsoon (=seasonal wind, a term derived from Arabic), says Dr. Simpson, " is not the simple result of a single physical condition ; it is produced by a combination of circumstances, involving considerations of temperature, pressure, humidity, geographical relationships between land and sea, the rotation of the earth, and lastly, but probably the most important, the distribution of mountain ranges." In the absence of disturbing factors, India would normally lie in the wind-belt commonly known as the North-East Trades, and we might regard the north-east monsoon of the winter months as the wind which belongs to the ordinary course of events. The latter is usually explained as being due to the movement of air seawards when the land mass, owing to its more rapid rate of cooling, becomes colder than the sea and the air above it has consequently a higher pressure than that over the sea. As this air is moving

Equator-wards, and therefore always getting warmer, its moisture-bearing capacity increases, and like the North-East Trades, it is a *drying* wind, *i.e.* not a *dry* wind containing no moisture, but one which readily absorbs moisture, and hence dries up the lands over which it passes. The Trade Winds always tend to produce drought, and so does the north-east monsoon in India ; but as in each case the air really contains a great deal of moisture, both these winds will

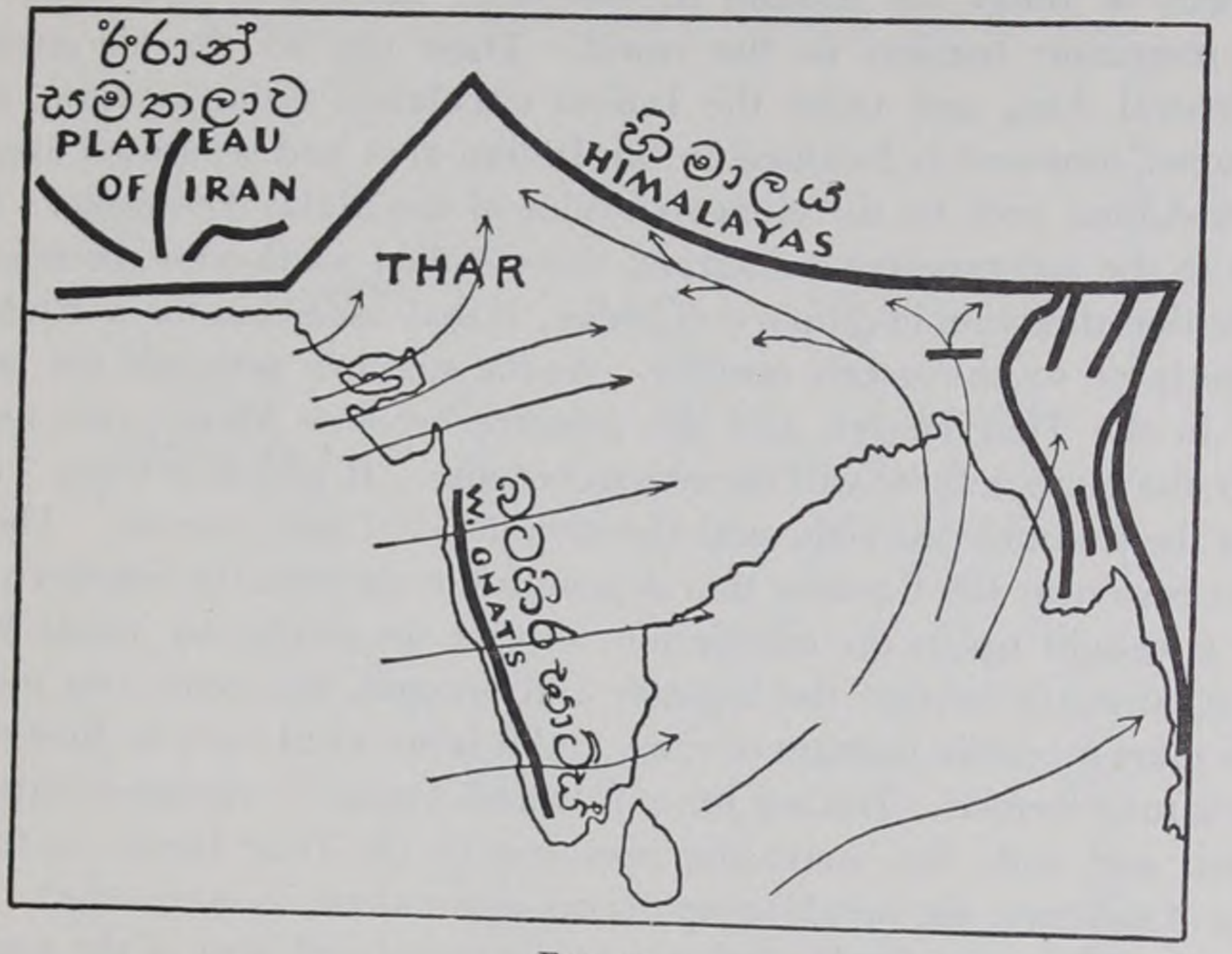


FIG. 41.

Diagram of Stream Lines of Air [thin lines with arrows] during the S.W. Monsoon. Thick lines denote mountain barriers. [Reproduced from *The South-west Monsoon*, by Dr. Simpson, by courtesy of the Royal Meteorological Society.]

produce rain if intercepted by a high mountain range. The north-east monsoon therefore produces rain along the eastern highlands of India, and a certain amount on the north-east edge of the hill country in Ceylon. This monsoon, however, is not a particularly strong feature of the climate, and has very little effect in certain parts of Ceylon, especially in the south and west. It would not excite much remark, except along the north and east coasts and on the north-east flank of the hill country.

The **south-west monsoon** is the really big feature of Indian climate, and has very important effects on its economic life. During the summer months the

land mass of India becomes very strongly heated, and a low-pressure area is formed in the north. For certain local reasons, partly due to the effect of a very dry current in the upper air, which moves in from the plateau of Iran, the focus of lowest pressure is established in the north-west, the centre being in the Thar Desert. Into this focus, where in July some of the lowest pressures in the world have been recorded, the air moves from all directions. The north of India has around it, like three sides of a box, some of the loftiest mountain barriers in the world. These cut off the air circulation from Central Asia, and make the Indian circulation quite separate, so that the summer monsoon is localised in the Indian area and separated even from the Indo-China area by the elongated folds of the Malay Peninsula. As will be seen in the accompanying diagram, the so-called south-west monsoon does not take that direction in all parts of India ; it may indeed in the north become an easterly or south-easterly current. As the summer proceeds the heat increases in the Thar Desert, and the pressure becomes lower ; the lower its pressure the more definite will the system become. It will, as it were, " tighten up " as the summer proceeds, and the area affected will increase. The south of India is so near the Equator that at length the air from the Southern Hemisphere is caught up in the circulation, so that the south-east Trade Wind is borne northwards beyond the Equator and becomes the south-west monsoon. All this takes a certain amount of time, and it is not until early in June that the system is fully formed. During June, July and August its strongest features are manifest, and with the increasing pressures in the Thar Desert in the later months of summer, the breaking-up occurs again along its outer edges. It will be seen therefore that Ceylon belongs to the peripheral area of the south-west monsoon, and is therefore mainly affected during the middle months of June, July and August, while at the beginning and the end of the south-west monsoon period it belongs to that area of uncertain happenings when the Thar focus is not sufficiently strong to extend its influence over such a wide area. During April and May, before the moist air has been drawn in from the southern ocean, the air currents round the coast are somewhat indefinite (see Fig. 42), and there is not a very decided movement inland from the sea. During this period practically no rain is formed in India except in the extreme south, and the land becomes exceedingly hot. The heat begins a little earlier in the south, and is not so strong there because the area is normally more moist and has a certain amount of convectional rain. The heat advances northwards and increases more in the driest part where the radiation is more rapid owing to the clearness

of the atmosphere, so that the Thar Desert is like a furnace during the month of May, and may be described as a heat focus which affects the land around it for a very great distance. As soon as the rains begin, the heat is considerably mitigated.

Fitting Ceylon into this scheme of events, it will be seen that, roughly speaking, the year will divide itself into four seasons, in two of which the normal

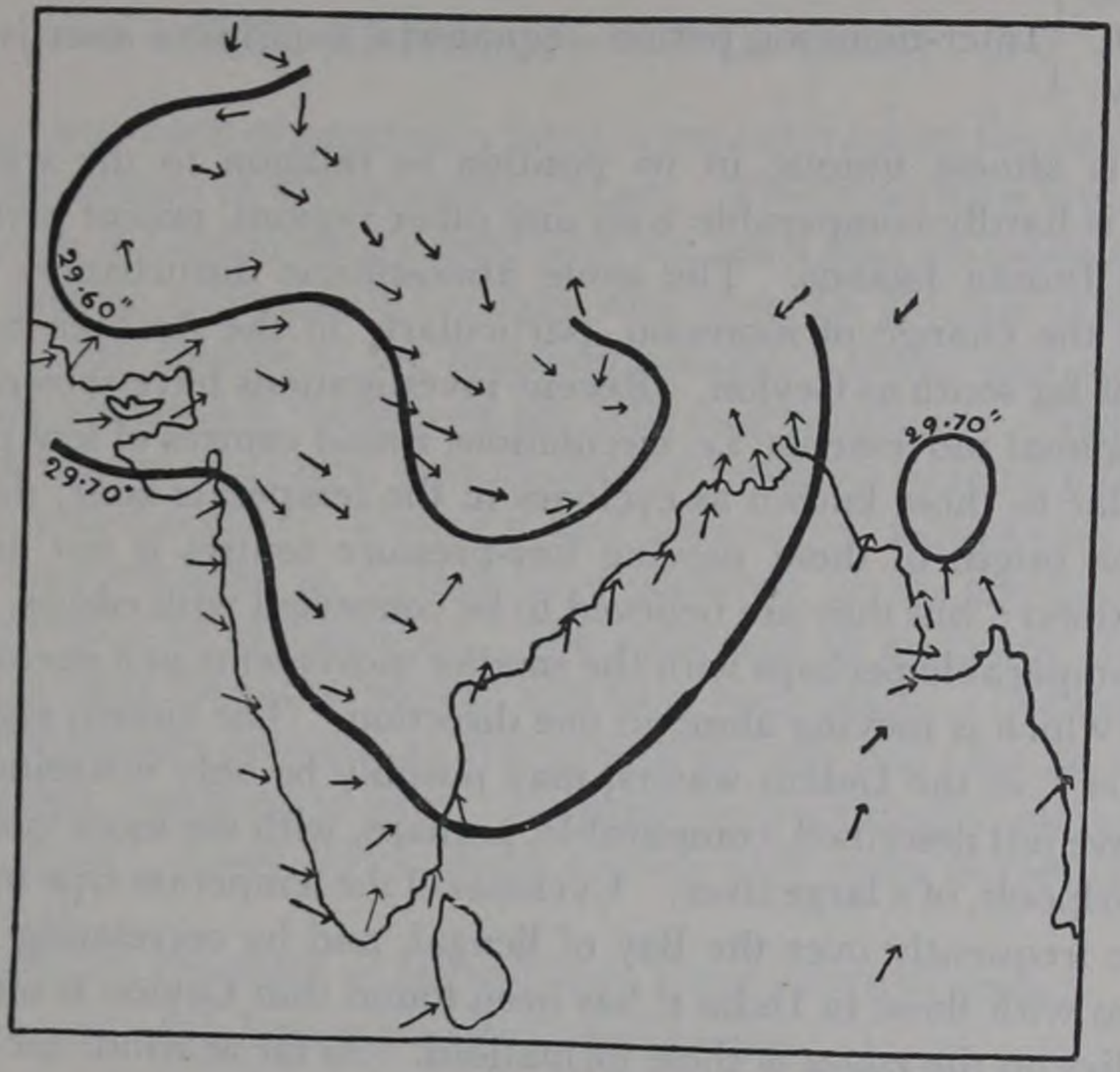


FIG. 42.

Pressure and Winds over India during May. Thick lines = isobars (lines joining places of equal pressure). Arrows show wind directions. [Reproduced by courtesy of the Royal Meteorological Society.]

equatorial conditions are predominant while in the other two the monsoons are strong enough to form a disturbing factor. The latter periods are not in any way clear-cut, and vary in length a little from year to year. The following division of the year, is, however, a useful one to bear in mind :

A. Dec., Jan., Feb. } N.E. monsoon asserting control.

B. Mar., Apr., May. } Inter-monsoon period—equatorial conditions dominant—"heat focus" of India influences the temperature.

C. June, July, Aug. } S.W. monsoon dominant.

D. Sept., Oct., Nov. } Inter-monsoon period—equatorial conditions assertive.

Ceylon is almost unique in its position in relation to the wind system, in which it is hardly comparable with any other regions, except perhaps a few of the East Indian Islands. The acute atmospheric disturbances which are common at the change of monsoon, particularly in the Arabian Sea, hardly ever occur as far south as Ceylon. Recent investigations have shown, however, that depressional movements, *i.e.* circulations round centres of low pressure, of a type similar to those known as cyclones in the temperate zone, do affect the island. The origin of these moving low-pressure centres is not as yet quite fully understood ; but they are believed to be connected with eddies, or crossing currents, comparable perhaps with the smaller movements in a stream of water, the bulk of which is moving along in one direction. The violent storms known as "cyclones" in the Indian waters, may possibly be only intensified forms of those we have just described, comparable, perhaps, with the more violent eddies, or little whirlpools, of a large river. Cyclones of the temperate type undoubtedly occur quite frequently over the Bay of Bengal, and by correlating the Ceylon observations with those in India it has been found that Ceylon is often affected because it lies on the edges of these formations. As far as winds are concerned, however, their effect is not remarkable, except in creating somewhat freshening breezes at times, or even quite strong gusts of wind, in the north-east portion of the island. Their influence on the rainfall is more important and will be discussed later.

Before leaving the subject of winds in Ceylon, let us reiterate that on the whole it is the calms rather than the winds which have the most fundamental influence on the climate, except in certain definite areas.

PART II. CHAPTER 7

THE RAINFALL OF CEYLON

The average text-book of geography is apt to over-emphasise the part played by winds and mountains in the causation of rain. This is perhaps the reason why so many people in Ceylon are obsessed with the belief that the monsoons and the mountains are the cause of all the rain, and that the greatest rainfall occurs everywhere in the middle of the monsoon seasons. Those who are possessed of this fallacy should ask themselves the following questions : Why does it so often rain in Ceylon on typical days of calm, in lowlands which are far removed from the mountain region ? How is it that the heaviest falls of rain in twenty-four hours ever recorded in Ceylon have occurred on the northern plain in the neighbourhood of Mullaittivu ? The right way to approach the study of rainfall is to consult the actual records that have been taken. The report of the Colombo Observatory contains all the records for any one year, as well as the monthly averages made up to date. It cannot be too strongly emphasised that the student should obtain one of these reports and make himself thoroughly familiar with it.

We may regard the study of rainfall from three points of view :

(1) Its geographical distribution ;
(2) Its seasonal distribution ;
(3) Its causes.

These will now be severally treated.

(1) The accompanying map shows the **distribution of mean annual rainfall** in Ceylon. It is obtained by collecting the daily records and adding them up for a whole year, and then finding the average for a series of years. The averages are most valuable when they have been taken over a long period ; quite a number in Ceylon exceed twenty years, and many go up to about sixty years. The dividing lines on the map, which are called isohyets, are drawn between the stations so as to cut off those having averages between the defined limits. It is to be remarked that these divisions pass in a more or less diagonal direction

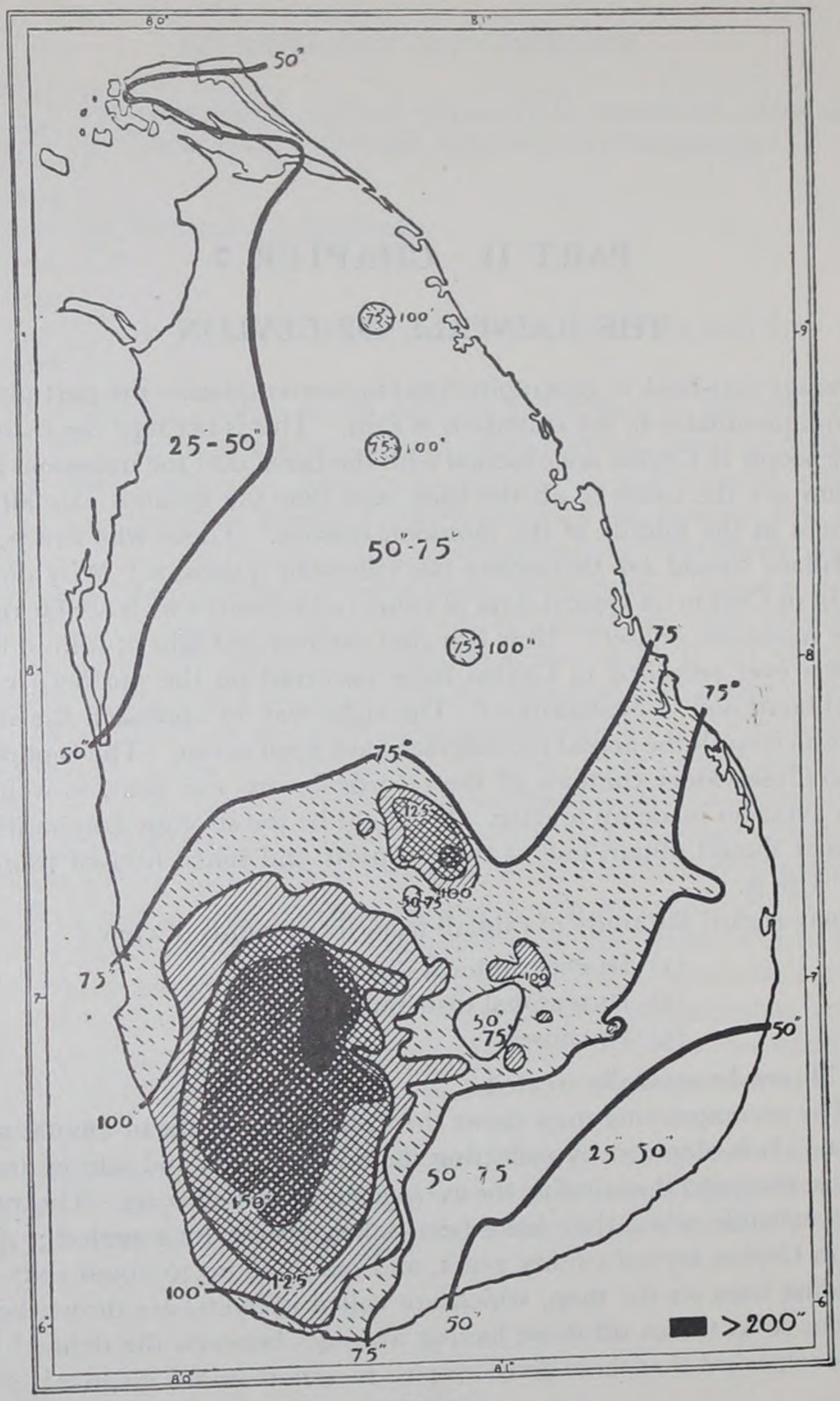


FIG. 43.

Average Annual Rainfall up to 1926, as in Report of Colombo Observatory. The dividing lines are called " isohyets."

across the island, from south-west to north-east. The island as a whole has a high rainfall, the greatest being concentrated in the south-western lowlands and the edges of the hill country, on each side of which it steadily decreases ; the lowest rainfall, under fifty inches, being experienced in two narrow coastal strips from Chilaw to Jaffna, and from Tangalla to Pottuvil. It should also be remarked that within the hill country itself there are two regions of comparatively low rainfall, both corresponding with structural hollows. The first, which is near Kandy, we might call the Malipitiya Hollow, after the name of the village at its centre ; the second is the Uva Basin. The highest rainfall of all is in a comparatively small area on the south-west flank of the hill country, in the neighbourhood of Adam's Peak. Here the majority of stations record considerably more than 200 inches a year. At Padupolla, where records have been taken for over fifty years, the average is 218 inches. At Carney Estate, in front of Adam's Peak, and Blackwater Estate, near Watawala, annual falls have exceeded 300 inches, but the records in both cases have only been taken for a few years. Some of the places in this area have had at different times phenomenal falls during twenty-four hours. On the accompanying map, however, which shows some of the record falls of rain in twenty-four hours, it will be noted that the greatest of all are not in this mountain region but in the lowlands most remote from the hill country. The average rainfall of London is twenty-five inches per year ; the whole of this rain, with the addition of nearly seven inches, fell in a single day at Nedunkeni, near Mankulam, in 1897. This is, of course, an exceptional fall, but it serves to emphasise the fact that mountains are not needed for the formation of rain. The place with the lowest average is Marichchukkaddi, of pearl-fishing fame, whose annual average is only 34 inches.

In studying the rainfall map of such a place as Ceylon, it should be remembered that the actual figures are not altogether comparable with those in the temperate zone. At a higher temperature the air holds proportionately much more vapour, and more is correspondingly ejected on cooling ; so that a single shower will usually be much greater in amount than in the cooler latitudes. For instance, an inch of rain is not in Ceylon considered as a great amount to fall in the course of a few hours, or even perhaps within the short space of an hour ; yet in England so rarely does this occur that when it does happen the newspapers are full of it. Though the amount in each shower is so great, the sun's rays are correspondingly more intense in Ceylon, and after a shower a great deal of the moisture is rapidly taken back again into the air by evaporation. A great deal of the rainfall may be described therefore as being

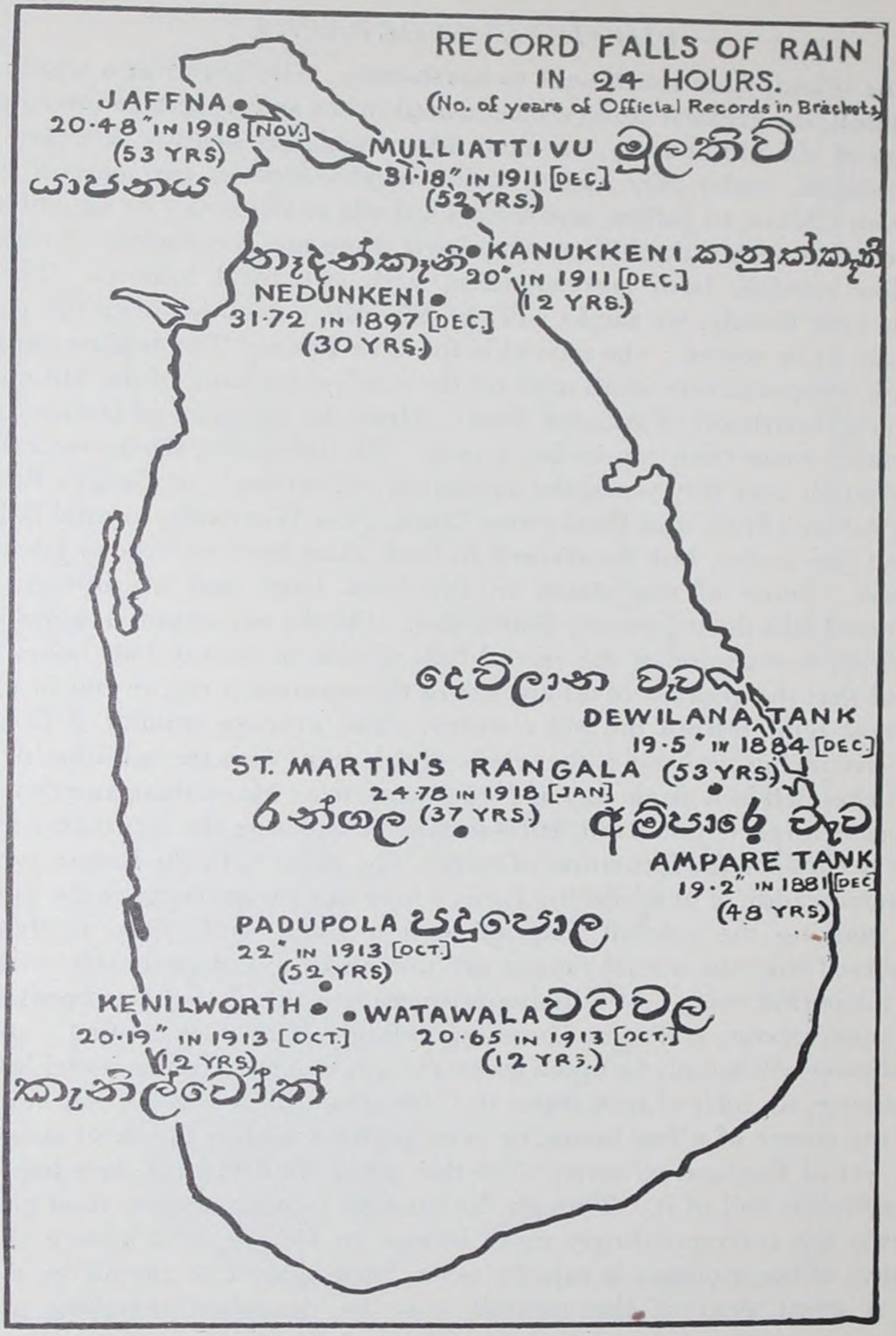

RECORD FALLS OF RAIN
IN 24 HOURS.
(No. of years of Official Records in Brackets)
JAFFNA
20·48" IN 1918 [NOV.]
(53 YRS)
යාපනය
MULLIATTIVU මුලතිව්
31·18" IN 1911 [DEC.]
(52 YRS.)
නැදුන්කැනි
NEDUNKENI
31·72 IN 1897 [DEC.]
(30 YRS.)
KANUKKENI කනුක්කැනි
20" IN 1911 [DEC.]
(12 YRS.)
දෙවිලාන වැව
DEWILANA TANK
19·5" IN 1884 [DEC.]
(53 YRS.)
ST. MARTIN'S RANGALA
24·78 IN 1918 [JAN.]
රන්ගල (37 YRS.)
අම්පාර වැව
AMPARE TANK
19·2" IN 1881 [DEC.]
(48 YRS)
PADUPOLA පදුපොල
22" IN 1913 [OCT.]
(52 YRS)
KENILWORTH
20·19" IN 1913 [OCT.]
(12 YRS)
කැනිල්වෝත්
WATAWALA වවවල
20·65 IN 1913 [OCT.]
(12 YRS.)

FIG. 44.

"ineffective" because it returns so quickly to the atmosphere that it is of no use to living organisms; this is the reason, however, why the humidity of the air is nearly always very high in Ceylon. Twenty-five inches of rain is in London quite sufficient to keep the vegetation green and to grow all the necessary crops without artificial irrigation; and a rainfall of rather less than twenty inches may be "effective" in the temperate zone. Yet in Ceylon even double this amount is quite ineffective, and reduces the land to a state of semi-desert. Even above fifty inches so much is lost by evaporation that artificial irrigation is necessary. We may broadly state that only within the area marked as exceeding seventy-five inches can cultivation be carried on without artificial water storage. The seventy-five inch isohyet cuts off nearly all the tanks. Broadly speaking, if the rainfall of a place is less than about four inches per month, it is ineffective in Ceylon. The places which, on the other hand, have more than 150 inches of rain have more than enough, and the great problem is to drain away the water in order to prevent floods.

(2) The accompanying map, which shows the **seasonal distribution of rainfall**, has been worked out from the records of the rainfall stations. The method by which it was produced can be better understood by first studying some typical rainfall graphs. The student should construct his own from the following figures:

AVERAGE MONTHLY RAINFALL IN INCHES AT CERTAIN STATIONS [TO 1926].

Months of the year.	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
Colombo - -	3·45	1·97	4·72	7·99	13·38	8·25	6·71	3·25	6·38	13·09	11·71	5·38
Anuradhapura -	4·01	1·51	2·79	6·67	3·36	1·32	1·28	1·73	3·03	9·70	10·67	8·77
Watawala - -	5·58	2·24	7·27	9·69	20·76	40·89	31·06	28·68	27·91	22·85	15·36	7·84
Kandy - -	5·18	2·21	4·00	6·66	5·69	9·45	7·49	5·76	6·02	11·71	10·59	8·95
Trincomalee -	6·67	2·07	1·67	1·92	2·44	1·25	2·08	3·99	4·41	8·34	14·03	14·16
St. Martin's, Rangalla	36·36	11·39	9·61	11·48	5·32	5·39	4·42	3·56	5·90	20·26	24·32	42·60
Badulla - -	9·66	2·95	4·53	7·30	4·59	2·24	1·97	3·19	3·46	9·72	10·54	12·32

Colombo is typical of a large number of places on the lowlands for which the curve rises somewhere near the equinoxes; that is to say, in what we have already described as the two inter-monsoon periods, while there is a fall in the amount during the middle of both monsoon seasons. This we will call for convenience, a "two-season" rainfall. In common, however, with a number of places in the South-Western Lowlands, Colombo has a higher rainfall than the North-Easterly Stations, *e.g.* Anuradhapura. A slight effect of the corresponding monsoon is noticeable in each case.

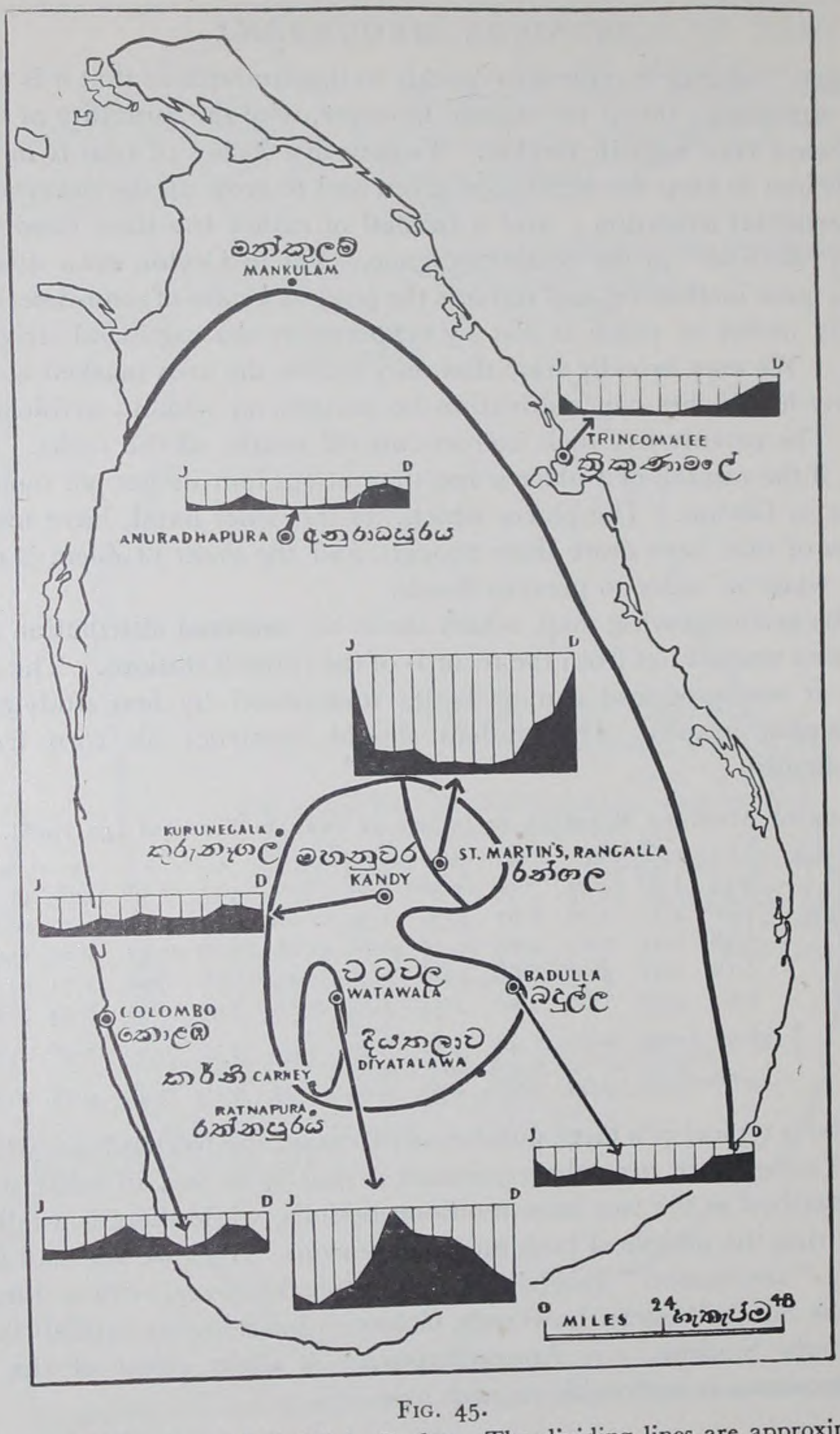


FIG. 45.

Seasonal Variation of Rainfall in Ceylon. The dividing lines are approximate, as there are transitional types. The graphs are typical of the areas to which they refer. J = January ; D = December.

Watawala graph is characterised by a sudden rise to an enormous rainfall during the month of June, and a high rain continuing during the whole of the south-west monsoon season. This which we will call a "one-season" rainfall, is characteristic of most of the stations on the high hill country which faces the south-west monsoon and has a rainfall of over 200 inches.

In the Kandy graph we find that the curve has three distinct peaks in April, June and October. This " three season " fall is typical of many stations which lie in the south-west portion of the hill country, and appears to represent a combination of the Colombo and Watawala types. The tendency seems to be towards the formation of a type like Colombo with most rain near the equinoxes, but it is interrupted by an additional rainfall during the middle of the monsoon period.

Trincomalee shows quite another type, which has a single maximum during the north-east monsoon, and very little rain during the rest of the year. This " one-season fall " is typical of the coastal stations of the north and east, from Mannar to Pottuvil.

Rangalla shows a type very much like Watawala, and represents the north-east edge of the hill country, with a high " one-season " rain, but during the north-east monsoon season.

Badulla is somewhat like Kandy, with increased rainfall during the north-east instead of the south-west monsoon season.

Each of these stations is roughly representative of the area in which it is placed on the map. The types naturally grade into one another and the map merely attempts a broad classification of the stations on the basis of the types above described. It will help the student to realise the fact that the seasonal distribution of rainfall varies very greatly and is influenced by both the convectional circulation and the monsoons.

People who do not live in Ceylon are apt to look upon it as an island with abundant rainfall ; judging the whole by the most frequently visited places like Colombo or Kandy, they look upon it as one of the last places in the world where drought might occur. It should be noted, however, that more than half of Ceylon does suffer rather severely from drought. The area referred to is the portion outside the seventy-five inch isohyet, where for so many months in the year the rainfall is less than about four inches per month, and therefore quite ineffective. It will be a surprise to most foreigners to find how many places in this area have their wells dried up for a large portion of the year, so that water has to be fetched for distances of several miles, while the stagnant pools

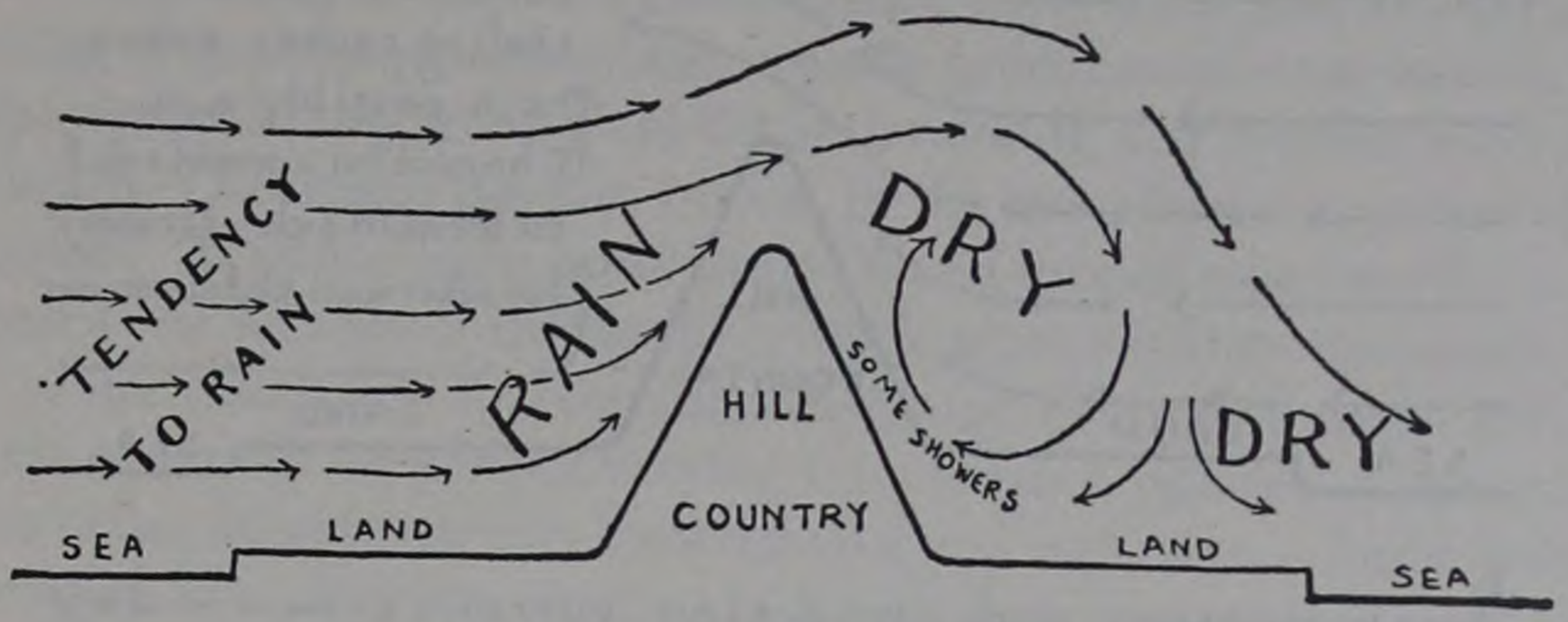
in which flies breed have disappeared to such an extent that the malarial mosquito is quite rare for many months of the year. At the same time the rivers dry up, and many of them are reduced to a mere trickle of water, winding about over a dry sandy bed. The coastal areas from Mannar to Pottuvil have a very marked drought during the whole of the south-west monsoon season, while in the other stations of the northern lowland there are two drought seasons, the worst also being in the middle of the south-west monsoon season.

(3) Now that a clear idea has been gained of the seasonal distribution of rain in Ceylon, it is more easy to get at the causes, some of which will doubtless have suggested themselves owing to what has previously been said about winds. In *Bulletin No. 4*, of the Colombo Observatory, Mr. Bamford has published some very useful diagrams, which are here reproduced, and which should be carefully studied in relation to the remarks which follow. The diagrams relating to air circulation are only intended to be suggestive, and it should not be imagined that they represent actual instances of things which may be seen in the atmosphere. Air movements are exceedingly complex, and vary from moment to moment, but by picking out a few distinctive movements, which are shown up on the records, and explaining them, a skilled observer can help us to get some idea of what is going on. Both of these sets of diagrams point towards the division of the year into the four seasons which have been suggested in the Section on Winds.

The best way to approach the subject of the causes of rain in Ceylon is to start with the assumption, which has already been discussed, that calms are the normal course of events, while the monsoon winds are to be regarded as temporary disturbing factors. Let us start by considering the events which take place during the course of what most people would regard as a typical day in Ceylon. It is a day of calm, or of very slight atmospheric movement. Brilliant sunshine begins soon after dawn, and the sky is uncommonly blue and clear, so clear that the most extensive views can be obtained from any of the high peaks in the hill country. As the morning advances, the sky gradually becomes decorated with small, white, billowy clouds, which form at a very definite level, and increase in size and density during the heat of the day, being most abundant over the low country. When viewed from the top of a high hill, a thin film is seen to form, which slightly veils the lowlands, and from out of which streaming masses can be seen to rise. The up-and-down movement of the air can usually be distinguished from above. As the cloud mass thickens, the lowlands are at length completely blocked from view by a surging sea of cloud, from which here

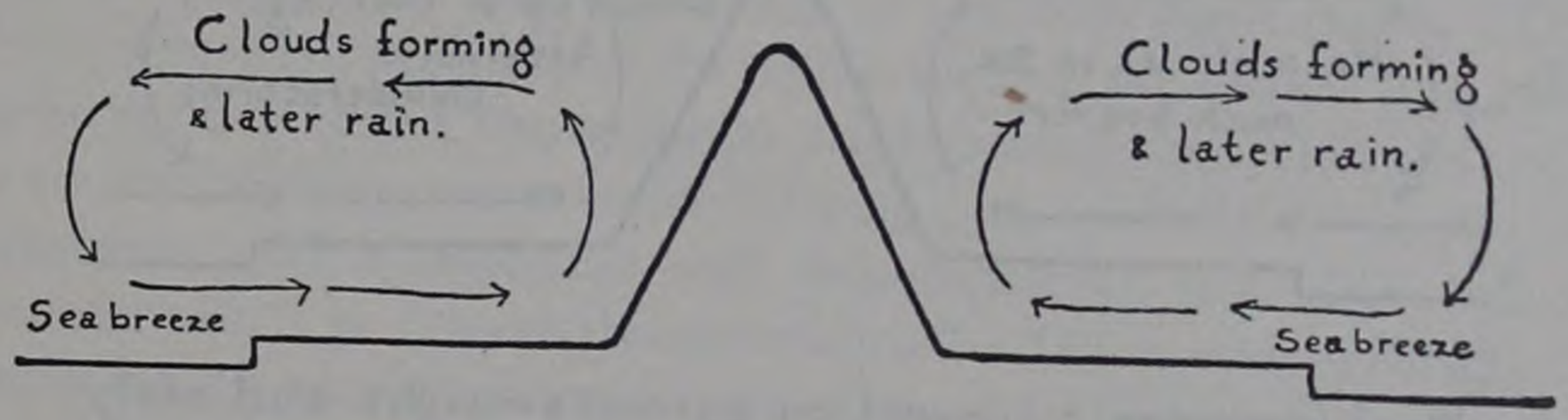
SOME PROBABLE TYPES
OF
AIR CIRCULATION OVER CEYLON.

1. MONSOON IN COMPLETE CONTROL, AS IN JUNE & JULY.



2. DAY AND NIGHT CIRCULATION IN INTER- MONSOON PERIODS - AS IN MARCH OR APRIL.

a. Convectional circulation – day. Afternoon thunderstorms.



b. Convectional circulation – night and early morning.

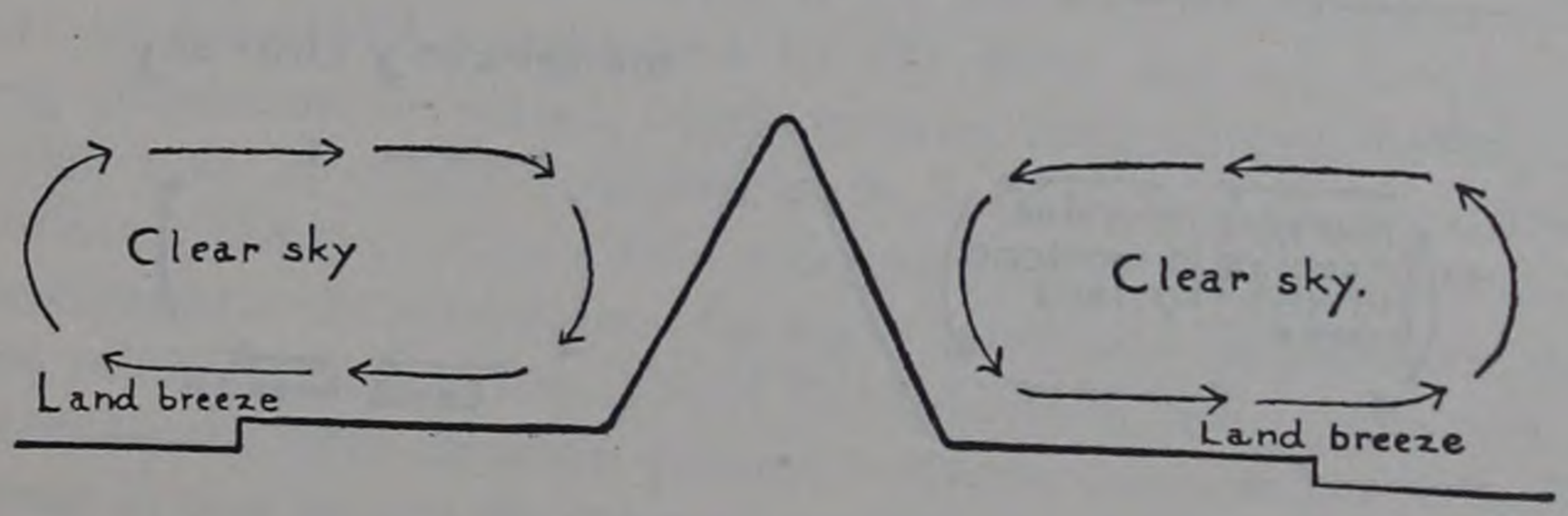
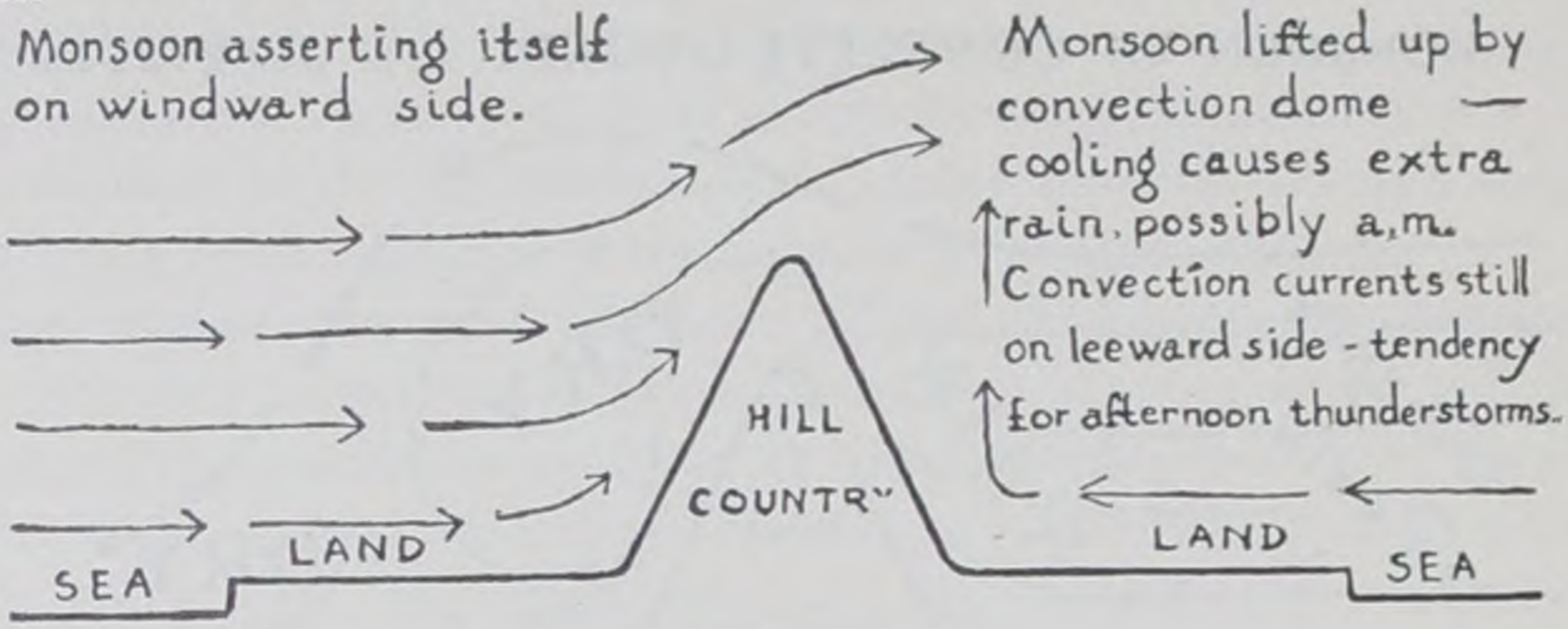


FIG. 46A.
[By courtesy of the Superintendent of Colombo Observatory.]

AIR CIRCULATION CONTINUED:

3. SOME TRANSITIONAL TYPES.

a.


Monsoon asserting itself on windward side.
Monsoon lifted up by convection dome — cooling causes extra rain, possibly a.m. Convection currents still on leeward side - tendency for afternoon thunderstorms.
HILL COUNTRY
SEA
LAND
LAND
SEA

b. Weak monsoon and convection currents — - - day

Current strengthens convectional circulation and delays its break up in evening.
Rain etc. as in 2.a. much heavier
Afternoon thunderstorms.

c. Weak monsoon & convection currents – night and early morning.

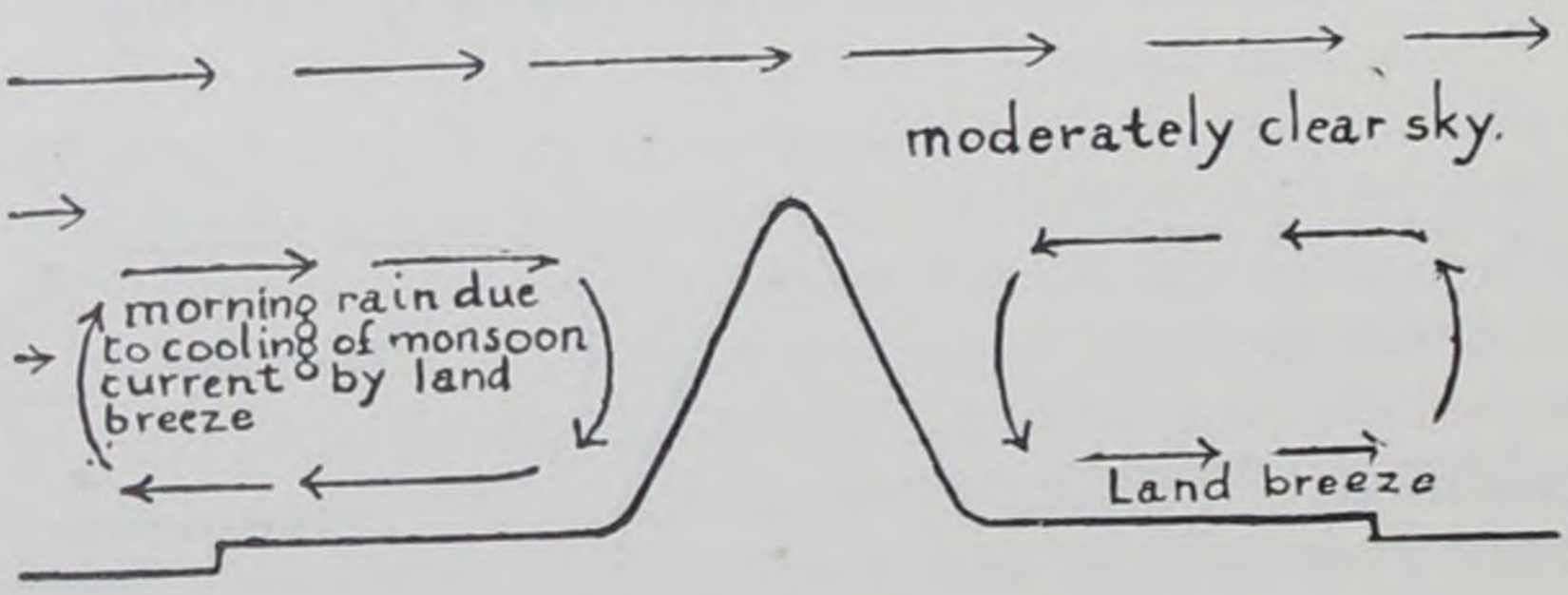


FIG. 46B.

[By courtesy of the Superintendent of Colombo Observatory.]

and there large tower-like structures project, which are the result of the strongest upward currents. Occasionally we see a clear space through which the sunlight is pouring, which from below forms a patch of vivid blue in the sky. By about three or four o'clock in the afternoon this process has reached its climax ; the air is beginning to cool, and condensation point is reached at a certain level. The rising of these large masses of air usually produces an electrical storm in the atmosphere, so that lightning plays about the clouds, and thunder is occasionally to be heard. At length the rain begins, in the late afternoon, often with great suddenness. It pours down quite straight, and exceedingly heavily, as though taps had been turned on in the sky. With great rapidity the small drops of water in the clouds run together and discharge themselves on to the ground. The rain continues for periods varying from about a quarter of an hour to two or three hours, most frequently between four and eight p.m. Sometimes it does not actually rain, but the clouds are heavy and threatening, with lightning playing about them. In either case as the cooling of the air continues, the clouds will gradually disappear, and the night becomes perfectly clear, so clear that the moonlight is remarkable, and when there is a good moon it is wonderfully easy to travel by night. This fact no doubt explains why so many temple ceremonies are held in the late evening, after eight o'clock, and why it is so often possible for pilgrims to take advantage of the cool night hours. This daily sequence of events is typical of lands within the Belt of Calms. The rain which is formed is often called **Convectional Rain,** because it is the result of cooling in the air, due to rising convectional currents ; as, however, it usually occurs in the afternoon, and is associated with thunderstorms, it is often called either " afternoon rain " or " local thunderstorms." The extent to which rain unaccompanied by wind is common in Ceylon, may be judged by the fact that such a large number of buildings are constructed with open sides ; this would be impossible if rain were constantly being driven indoors by the wind as it is in many other countries. On each side of the hill country the local convection currents are probably strengthened by the land and sea breezes, so that a strong circulation is created, which reverses itself during the night. This circulation with its effects is illustrated in Section 2. of the diagrams of Air Circulation. This type of rain is the most common in the lowlands, and naturally increases near the season when the sun is overhead. It produces, therefore, a yearly rainfall arranged like that of Colombo with two seasons of increased fall. During the inter-monsoon periods it always tends to assert itself, but it may occur at any time in the year all over the island. The diagrams showing

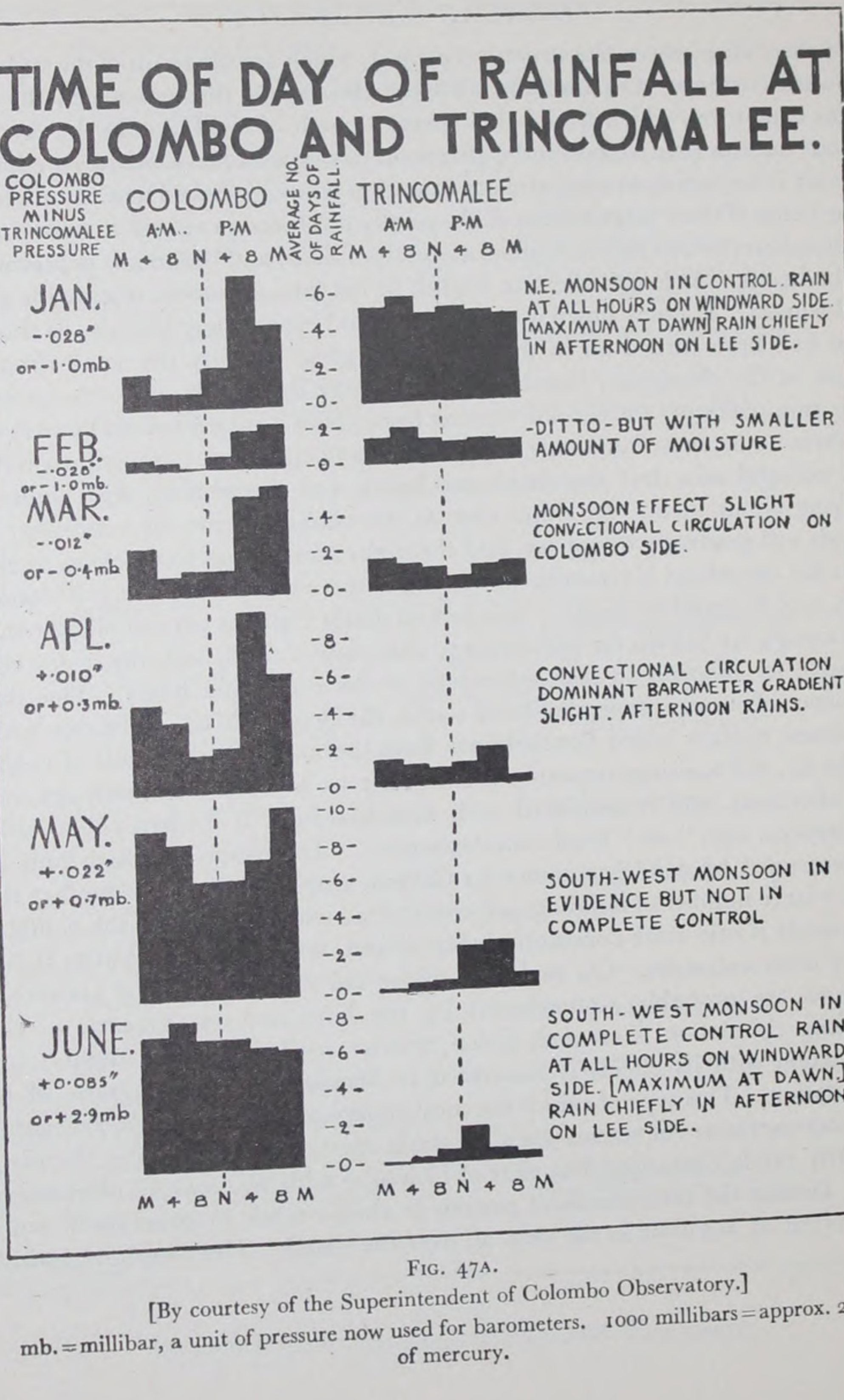


FIG. 47A.

[By courtesy of the Superintendent of Colombo Observatory.]

mb. = millibar, a unit of pressure now used for barometers. 1000 millibars = approx. 29·5" of mercury.

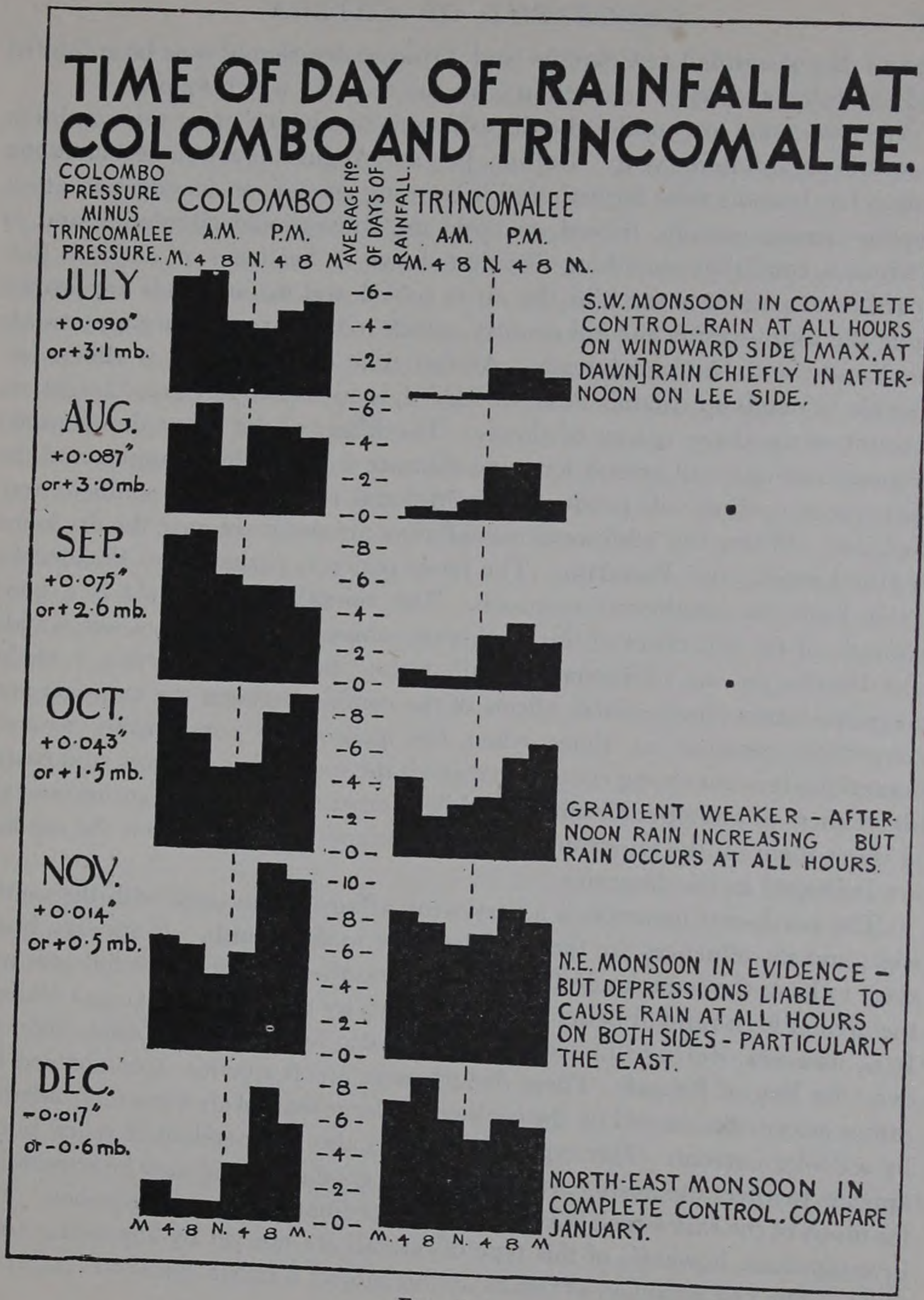


FIG. 47B.

[By courtesy of the Superintendent of Colombo Observatory.]

time of day of rainfall at Colombo and Trincomalee should now be consulted and carefully studied in connection with the remarks which follow.

We now come to consider the disturbing factors which upset this condition at certain periods in the year. In June, July and August the **south-west monsoon** system has become fully formed, and it is strong enough on its edges to affect Ceylon—strong enough, indeed, to upset the convectional circulation and to produce a condition something like that shown in Section 1. of diagram 46A. In rising to pass over the hills the air is cooled and dense clouds are formed along the south-west of the hill country, which roll in through the gaps towards the Kandy and Hatton plateaus. At this time of the year it is almost impossible to climb up Adam's Peak, or indeed, to ascend to any great height, on account of the dense masses of clouds. The lifting of the air as the monsoon becomes stronger will extend for some distance from the hill country, and the consequent cooling will produce an additional rainfall in the south-western lowlands. Where this additional rainfall does not occur we have the dry zones of Hambantota and Puttalam. The latter region is perhaps also shielded by India from the south-west monsoon. The rainfall of Watawala is a good example of the full effect of the south-west monsoon, while places like Kandy and Hatton get an additional rainfall during this season. Section 3. of the diagrams shows some possible effects of the conflict between the monsoon and convection currents, at times when the monsoon is considerably weaker. Sometimes it is not strong enough to disturb the convection currents, and passes above them as an upper air current, while at other times it is only strong enough to upset them on the windward side of the island. The effects on the rainfall are indicated in the diagrams.

The north-east monsoon is a very weak affair as compared with the south-west, and its influences are therefore less easy to distinguish. It appears, however, to have the same kind of effect on the north-east edge of the hill country, the area of high rainfall being broken into two by the Mahaweli Ganga Valley. It is, however, during this season that cyclonic formations are most common over the Bay of Bengal. These disturbances are frequently accompanied by rather heavy rain, caused by the cooling of a large mass of air when it is undercut by a cooler current. This type of rainfall is also independent of relief, but it appears to affect the north-east coast lands a good deal, and may be responsible for much of the rain which is ascribed to the ordinary north-east monsoon. The investigations, however, of this type of rainfall are not yet by any means complete. The first summary of results on this subject is in Mr. Bamford's paper on

"Cyclonic Movements in Ceylon." It is not at all easy to explain why the coast lands from Mannar to Pottuvil have only a single maximum, which is during the monsoon season, while most of the other northern places have the double maximum near the equinoxes; the conditions along the north-east coast, however, are no doubt greatly complicated by its relation to the cyclonic movements which are more frequent further north. Movements of this type are much more common in the Anti-Trade Wind Belt than they are near the Equator. The formations are referred to either as "cyclones" or as "depressions." They are to be distinguished from the violent whirling storms which are called "cyclones," and which occur in the Arabian Sea during the change of the monsoons. It is possible that these violent cyclones are, with their heavier rainfall, only an intensified form of the others, but they are generally treated separately in studies of climate. Ceylon is practically free from the more violent form, but during the north-east monsoon from time to time it comes under the influence of "depressions" (so called because they are centres of low pressure). This type of cyclone is an atmospheric disturbance which is probably created by the irregular movement of the atmosphere. It may be due to some sort of eddy movement, especially to the passage of a cold eddy of air underneath a warmer current. The reason for their origin is not fully understood. The effect is generally to create an area of low pressure associated with the centre of the eddy, and the lifting of the warmer current and its consequent cooling cause the formation of a large amount of cloud, which may eventually give rise to a large patch of rain. This rain, unlike the usual convectional rain of Ceylon, starts gradually, is often drizzling in character, occurs at any time during the day or night, and bears no relation to the relief of the country. The depression is described as "deep" when the centre has a very low pressure, and the pressure gradient around it is rather high. The wind is then relatively stronger and may attain a gale force, or at any rate cause what would be called a storm in Ceylon, and the rain is relatively heavier. As already noted, however, Ceylon as a rule only comes in for a portion of these disturbances, which are usually several hundred miles in diameter. They sometimes affect the weather of the northern lowlands, and even have a slight effect on the southern part of the island for periods ranging between a day and a week. The most characteristic result is usually a curious strip of rain across the island, which appears to bear little relation to anything in the island itself.

PART II. CHAPTER 8

TEMPERATURE

REFERENCE has already been made in the Section on Latitude, to certain facts relating to the temperature of Ceylon. Because the island is near the equator, for reasons previously stated it will naturally be hot. It must be noted, however, that though the equatorial regions have such intense insolation, they do not as a rule have the highest temperature ; this is because they are moist. The highest temperatures in the world occur in the driest regions ; *e.g.* in India, the Thar Desert contains places with averages of over 90° F. in the shade for several months in the year, and experiences heat which is unknown in Ceylon, in spite of the fact that it is about 20° of latitude farther away from the equator. When the air is clear and dry radiation is much more rapid, and the air is both heated and cooled at a much more rapid rate. Clouds impede radiation, and they not only protect the surface from the sun's rays, but they also keep in the heat which is already in the air below them, so that a cloudy land like Ceylon, especially when the clouds are most numerous in the hottest part of the day, will tend to maintain a remarkably even temperature. The even heat of Ceylon is not, however, entirely due to this ; it is also probably equally due to the effect of the sea. No part of the island is more than about fifty miles away from the coast. As the sea both heats and cools more slowly than land, it exercises a tempering effect upon the climate, cooling the land during the daytime and warming it at night. In places which are far from the sea, the range of temperature during twenty-four hours is always relatively greater. This characteristic of even heat occurs in nearly all islands which are near to the equator, which as a rule remain remarkably near to 80° F. In Ceylon the range of temperature during twenty-four hours rarely exceeds 5° F., while quite often the difference between day and night temperatures is hardly perceptible. Places along the coast, or only a short distance inland, have the smallest range, especially the ones which face the southern ocean, such as Galle, Matara and Tangalla, where during the whole year the range of temperature is only about 7° F. Such a climate is described as being " oceanic."

A map showing average temperatures for the whole year is in most countries of very little value, because it gives no idea of the variations which occur either daily or seasonally. This is the more true of regions in the middle of continents or those which lie in the temperate zone where the seasonal variations are greatest. If, for example, the midday temperature is 90° F., while the night minimum is only 40°, we are apt to give a wrong impression by stating that the mean daily temperature is 65° F. We might think of this place as being a cool and pleasant spot. The same might be true of the yearly variation. It is therefore only in places of even heat, like Ceylon, that a map showing isotherms which represent yearly averages, is of any real value to the student. The temperature map which is here given shows the yearly averages and represents temperatures which are commonly experienced both day and night and throughout the year. It will be noticed that practically the whole of the lowlands have temperatures which are very near to 80° F. and that roughly speaking the highest are in those portions of the north and east which have the longest season of ineffective rainfall. The temperature decreases with altitude, so that a series of isotherms lie in circles round the hill country. At the highest observing station in Ceylon, Nuwara Eliya (6188 feet), which is also the highest inhabited spot, the temperature always remains very near to 60° F. ; this is in accordance with the general rule, observable almost anywhere, that the temperature decreases 1° F. for every 300 feet of altitude. These temperatures are all taken in the shade ; in the open sunlight it may be considerably higher than this. The average shade temperatures for each month taken separately rarely exceed 85° F., even at the hottest season. Trincomalee has an average of 86° F. in May, and over 85° F. in both April and June. Mannar and Jaffna both exceed 85° F. in April and May, and Batticaloa in June. Most people experience some amount of discomfort when the temperature is greater than 85° F. while near 80° F. they are perfectly comfortable and can work with ease. If the average for any month is 85° F., it means that there must be a number of days when the temperature is considerably higher than this. At intervals there are record temperatures, which, however, are not common in Ceylon, approaching 100° F. The highest day maximum for the year is generally quoted in the Observatory Report. The highest ever known was on May 12th, 1890, at Trincomalee, which often supplies the record, and had on that day 103·7° F. in the shade. As a rule, however, the record for the year does not exceed 100° F. ; *e.g.* in 1925 it was at Batticaloa 99·6° F.

Low temperatures are almost unknown, even at a high level. The inhabitant

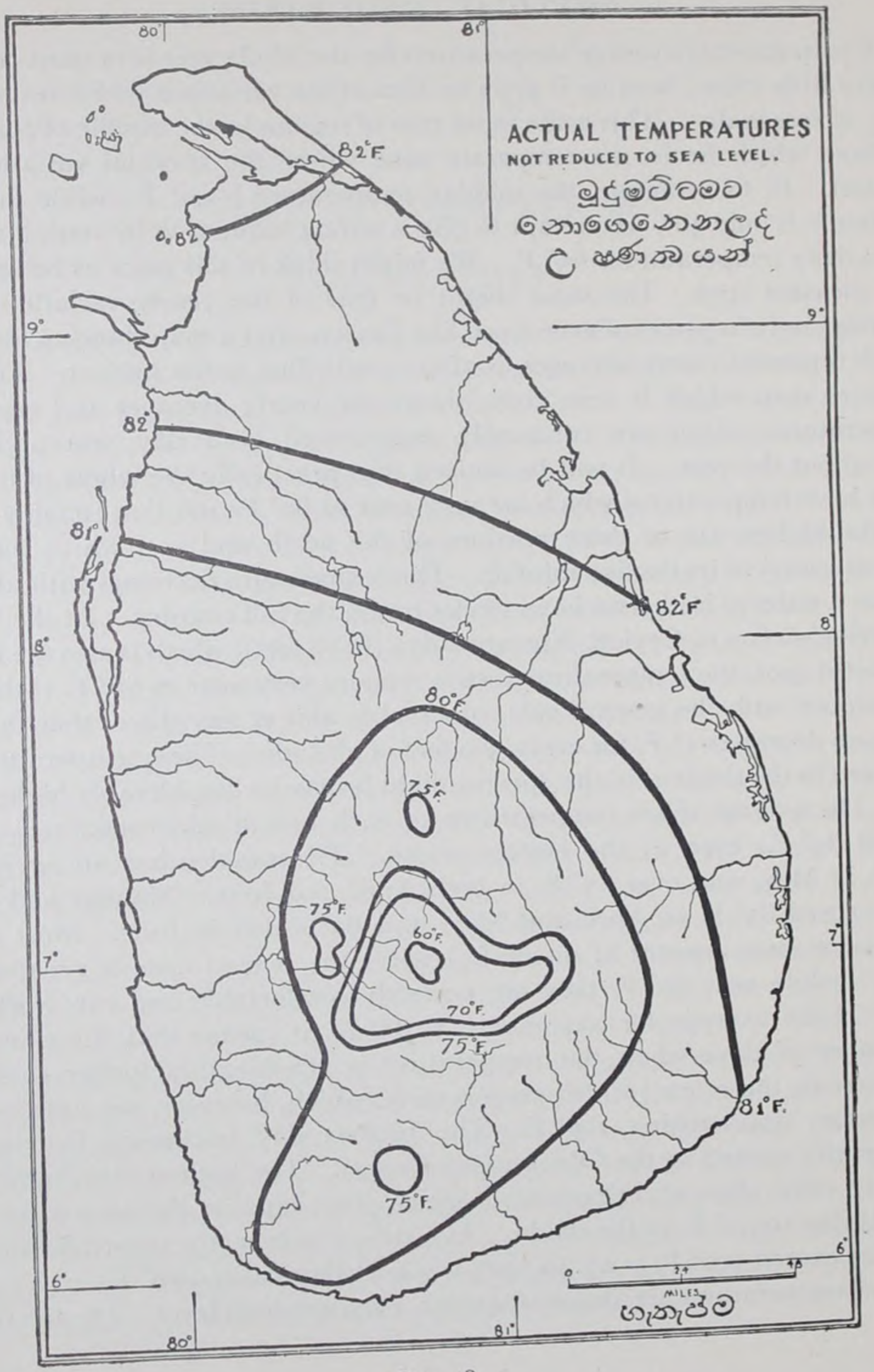


FIG. 48.

Isotherm Map showing average yearly temperatures.

of Ceylon can have no conception of what cold is really like, unless he goes to other countries. Snow is practically unknown, and frosts are extremely rare. The mean yearly temperature at Nuwara Eliya is 55·3° F. and it has the greatest range of temperature in the whole island—17·4° F. is the average amount of variation during the year. (At Colombo it is 12·3° F. and at Galle only 7·4° F.) Nuwara Eliya is the only observatory where the thermometer has ever been known to sink below freezing point; in 1914, 27·1° F. was recorded—that is, five degrees of frost, which is the lowest temperature on record in the island.

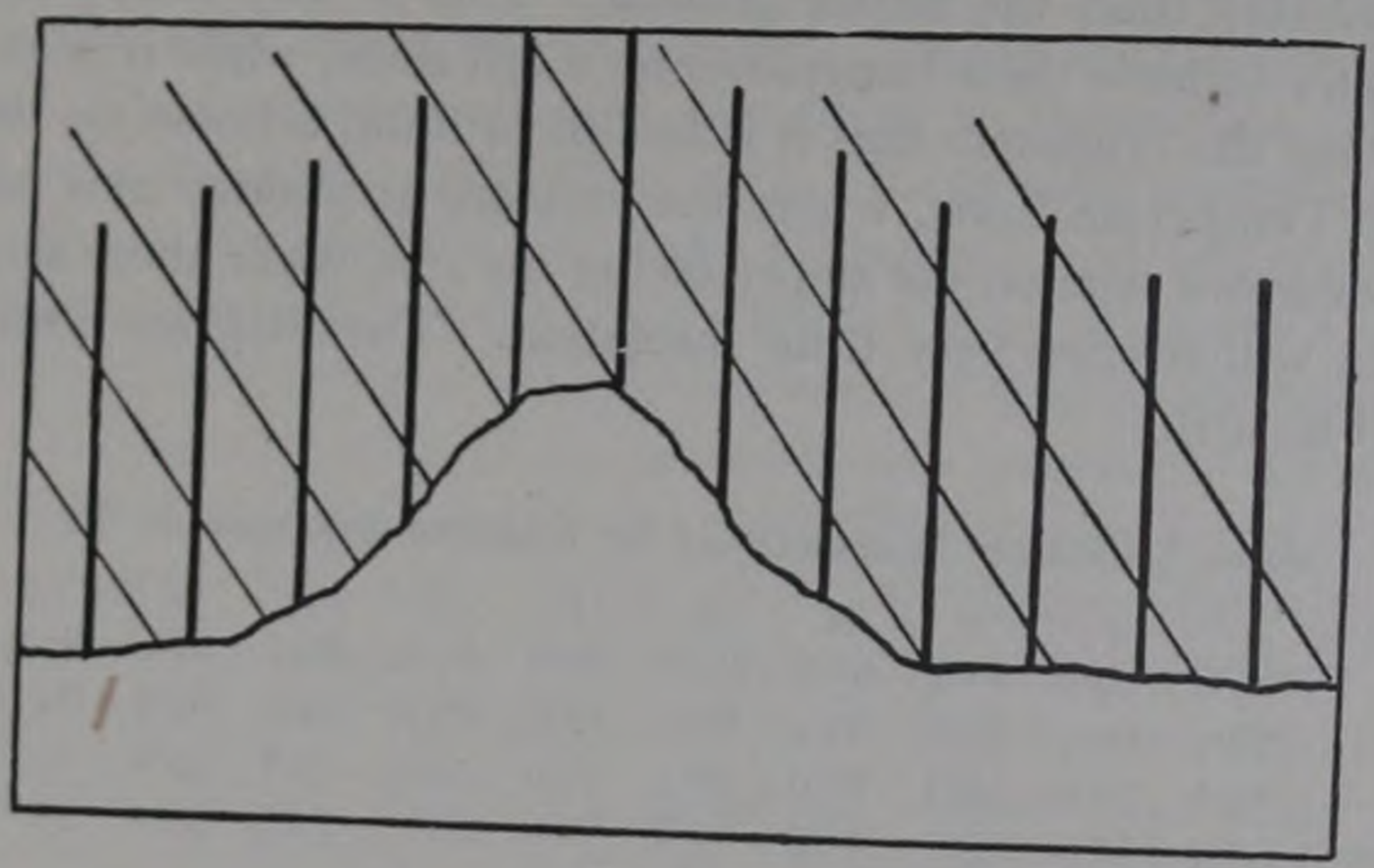


FIG. 49.

The lower portion of the diagram represents a hill and part of a plain. Suppose that the black parallel lines represent equidistant rays of the sun, the darker lines being vertical on the lowlands and hilltop, the lighter ones at any angle to the surface. Compare the number of rays on a given area in different parts of the diagram.

It has also had the greatest yearly variation of 46·9° F. Nuwara Eliya is often described as having conditions akin to those in the temperate zone, but in reality they are not at all similar; for instance, in spite of the temperature being lower than it is on the lowlands, it is possible for an Englishman to get sunstroke at Nuwara Eliya, a matter which is almost impossible in his own country, except during periods of phenomenal heat. This is due to the fact that all over Ceylon the sun's rays touch the earth at a higher angle, and hence are much more concentrated, and even though the temperature is not high, such concentrated rays may have adverse effects on the nervous system of people who are not native to the country. A prolonged stay in Nuwara Eliya does not have the same beneficial effect on a European who is suffering from the moist heat of the

lowlands as a holiday spent in a more northern latitude where the insolation is always relatively weaker.

Hill slopes intercept the sun's rays at a different angle from that which they make with a level surface ; hence, the amount of insolation on a hill slope is often very different from that on the level ground. If the sun is overhead, or at a very high angle to the level, it strikes the tilted surface at a much smaller angle, and hence the rays are more spread out on a hill slope than they are on lowlands, so that during the greater part of the year in Ceylon the hill slopes are cooler at mid-day than the flatter ground. This is why European planters generally prefer to have their bungalows on a hill slope, while it is an accepted notion amongst the Sinhalese that it is foolish to build a house on the top of a hill. In the Temperate Zone, where the rays are at midday at a much lower angle, the reverse is true on the slopes facing the sun, while those sloping away from the sun will receive very little insolation. The diagram illustrates this difference (Fig. 49).

MEAN MONTHLY TEMPERATURE AT CERTAIN STATIONS IN °F.

Months of the year.	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.
Colombo -	79·0	79·8	81·4	82·6	82·6	81·6	81·0	81·1	81·0	80·3	79·6	79·0
Trincomalee	78·7	80·4	82·6	85·2	86·2	85·6	85·2	84·8	84·6	82·6	80·0	78·6
Kandy -	74·5	76·0	78·3	79·0	78·7	76·6	75·8	75·8	75·8	75·8	75·4	74·5
Nuwara Eliya	57·4	57·5	59·1	60·5	61·8	60·0	59·0	59·5	59·4	59·6	59·2	57·9

PART II. CHAPTER 9

THE INLAND WATERS OF CEYLON

WATER which falls on to the land as rain flows off over the surface, forming rivers ; it also soaks down into the ground, forming underground reservoirs in the rocks. The proportion of water remaining on the surface depends largely upon the nature of the underlying rock. In certain limestone regions, for instance, almost the whole of the water disappears underground, because the rock is both soluble and porous ; while there are granitic masses so compact and impermeable that nearly the whole of the water is held up on the surface. The drainage on different rocks is always quite characteristic. Consequently the number and size of the rivers of any area depend a great deal upon (1) the underlying rocks. Two other factors, however, are extremely important—(2) the rainfall, and (3) amount of evaporation. Let us see how these three factors have influenced the flow of underground and surface waters in Ceylon.

The greater part of this island consists of massive crystalline rocks, which are, as a rule, impermeable. They have, however, a bedded structure, almost everywhere, and in addition are very much bent and jointed. So that while, on the whole, the rock itself does not soak up much water, a great deal is able to flow away underground along cracks. In the low country, where the surface is covered with kabouk, a good deal of water is absorbed by the clay. If this clay were all solid and not pierced by holes, much of the low country would be covered by undrainable marshes, because the water would merely stand about on the clay. As the kabouk is full of holes, water circulates in it freely ; thus there are very few parts of Ceylon that are without a supply of underground water. In the hill country most people get their water from springs ; these occur at points where there are cracks or holes at the surface which allow the water flowing along the bands and joints to escape. The following diagram illustrates the kind of thing which commonly happens. [Fig. 50.]

A spring might occur at any of the points marked S owing to the circulation of water through the cracks which everywhere penetrate the rock. These rocks are not to be regarded as a single mass, but as a collection of segments which all

fit in together like a jig-saw puzzle ; every single band is in itself divided up into portions fitting together. It is not, therefore, surprising that all over the hill country springs are to be found, while wells are little in use. On the floors of many of the valleys, where there is a great collection of alluvial deposits, wells could easily be bored ; but it is so much easier to get water from the springs that wells have hardly ever been used.

In the low country in the areas which have been buried by kabouk, wells are usually employed. The water flowing through holes in the kabouk, or

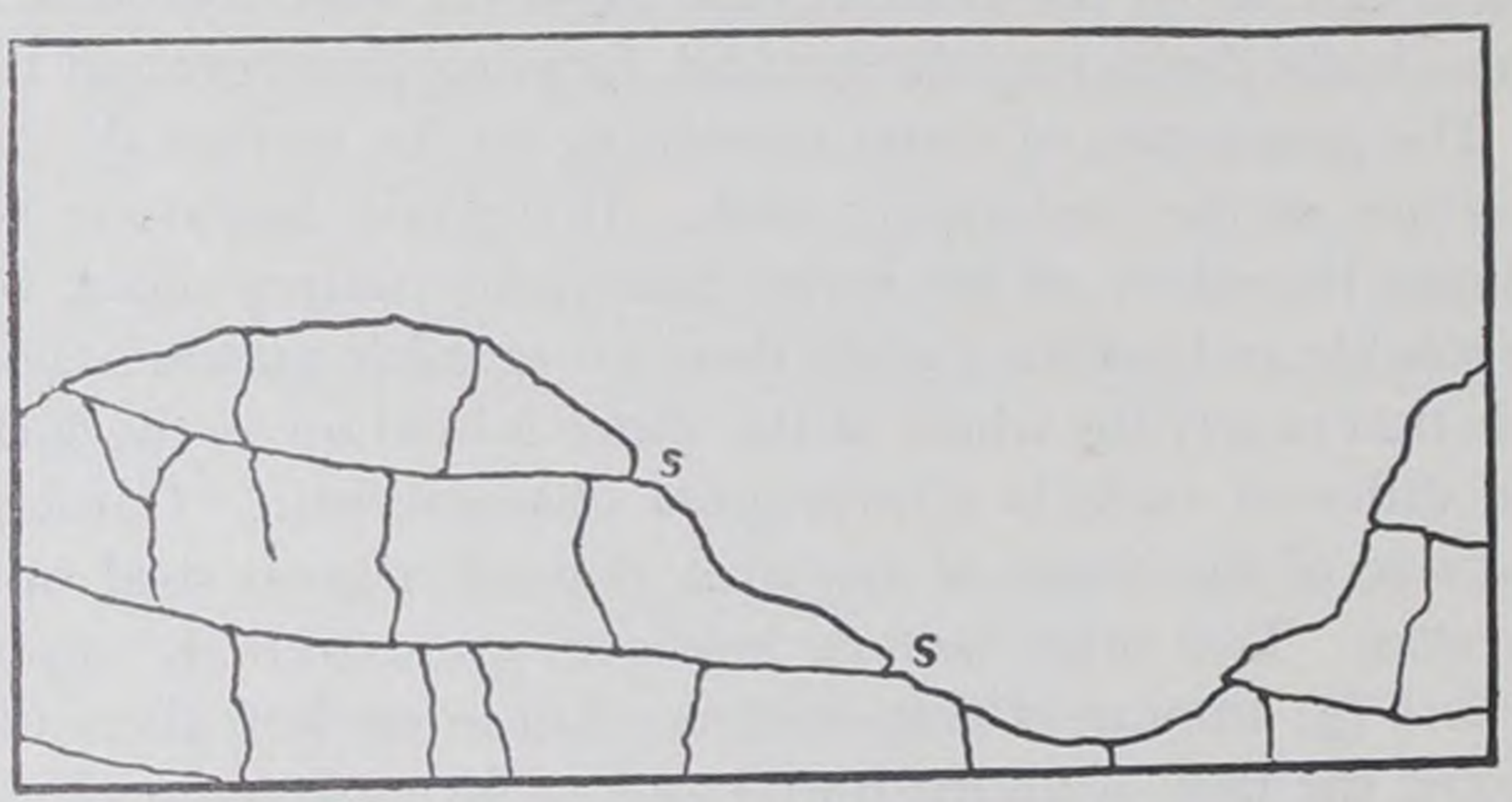


FIG. 50.
Diagram to illustrate the situation of Springs in the Crystalline Rock.
At the points marked S water would emerge.

through more permeable sands, is held up on reaching the crystalline surface below, and flows about on that surface ; it may, of course, form springs at places where a sloping slab of crystalline rock comes out at the surface, but as a rule it just remains underground, forming great reservoirs of water. If the surface deposits become completely soaked there will be water standing about on the ground, and marshes will be formed. The following diagram illustrates the formation of a typical well in the low country :

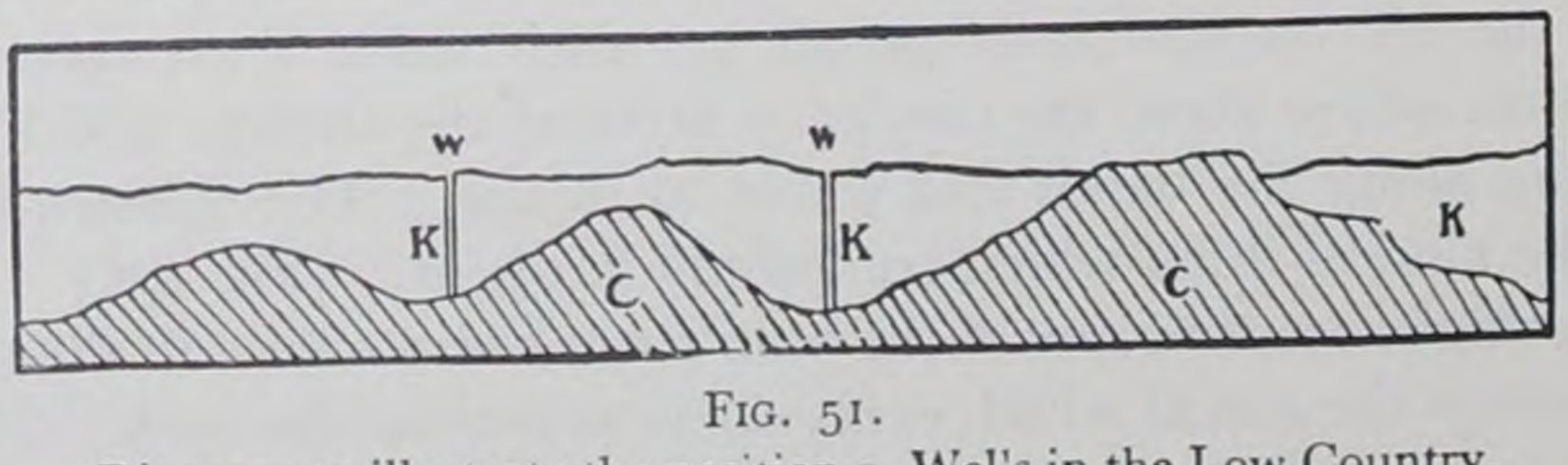


FIG. 51.
Diagram to illustrate the position of Wells in the Low Country.
K = kabouk, C = crystalline rock.

Hot springs occur at a number of places in Ceylon, the most celebrated being those at Kanniyai near Trincomalee, which have a great reputation for healing properties. There are a number near Bibile and Maha Oya in E. Province. The neighbourhood of some of these springs is called in Sinhalese "Unwaturu (=hot water) Bibile." Their origin is not yet known. Usually they are related to volcanic phenomena and associated with deep fissures in the ground, as in Japan. Dr. Comaraswamy, a former Government mineralogist, suggested that in Ceylon some might be formed by water draining through the cracks in the hill country, which descends to a low level and returns again to the surface. They generally contain a variety of mineral salts in solution. The springs in the Raté Mahatmaya's garden at Bibile are heavily charged with iron salts and are cooler by day than by night.

The proportion of water flowing underground in areas composed of crystalline rock, is not, as a rule, very great. The majority of the rain in the hill country flows away very quickly over the surface. Generally speaking it collects up along the structure lines, *e.g.* where the rocks have been ruptured or bent into hollows. Many valleys are formed where the broken edges of one bed of rock are leaning upon the face of the next bed below it. These are called "strike valleys" and their structure is illustrated in Fig. 52 Something of this sort is no doubt responsible for the parallel direction of the river valleys in certain areas—*e.g.* some of the upper tributaries of the Kelani and Mahaweli Rivers on the Hatton Plateau.

In the lowlands the run-off is not so great because the kabouk or other clayey deposits absorb so much water, while there are many depressions in the crystalline surface where it can accumulate.

In the Jaffna Peninsula and the islands near it we find a different set of conditions. The region is covered with a thick bed of very porous limestone, through which the water quickly penetrates, leaving the surface dry. Here we find all the leading features of what is called "karst country." "Karst" or "Carso" is the name of a region in Italy to the north of the Adriatic Sea which has such remarkable features that it has become classic ground for the study of the characteristics of limestone; hence the use of its name in this connection. Limestone is usually very much jointed, and is exceedingly porous. It is also easily acted upon by weak acids; the juice of a lime or some vinegar will dissolve it. Rain water nearly always contains a little acid, and as the water drains underground it will slightly dissolve the rock. Hence we find that limestone is usually full of holes underground, and practically all the water runs

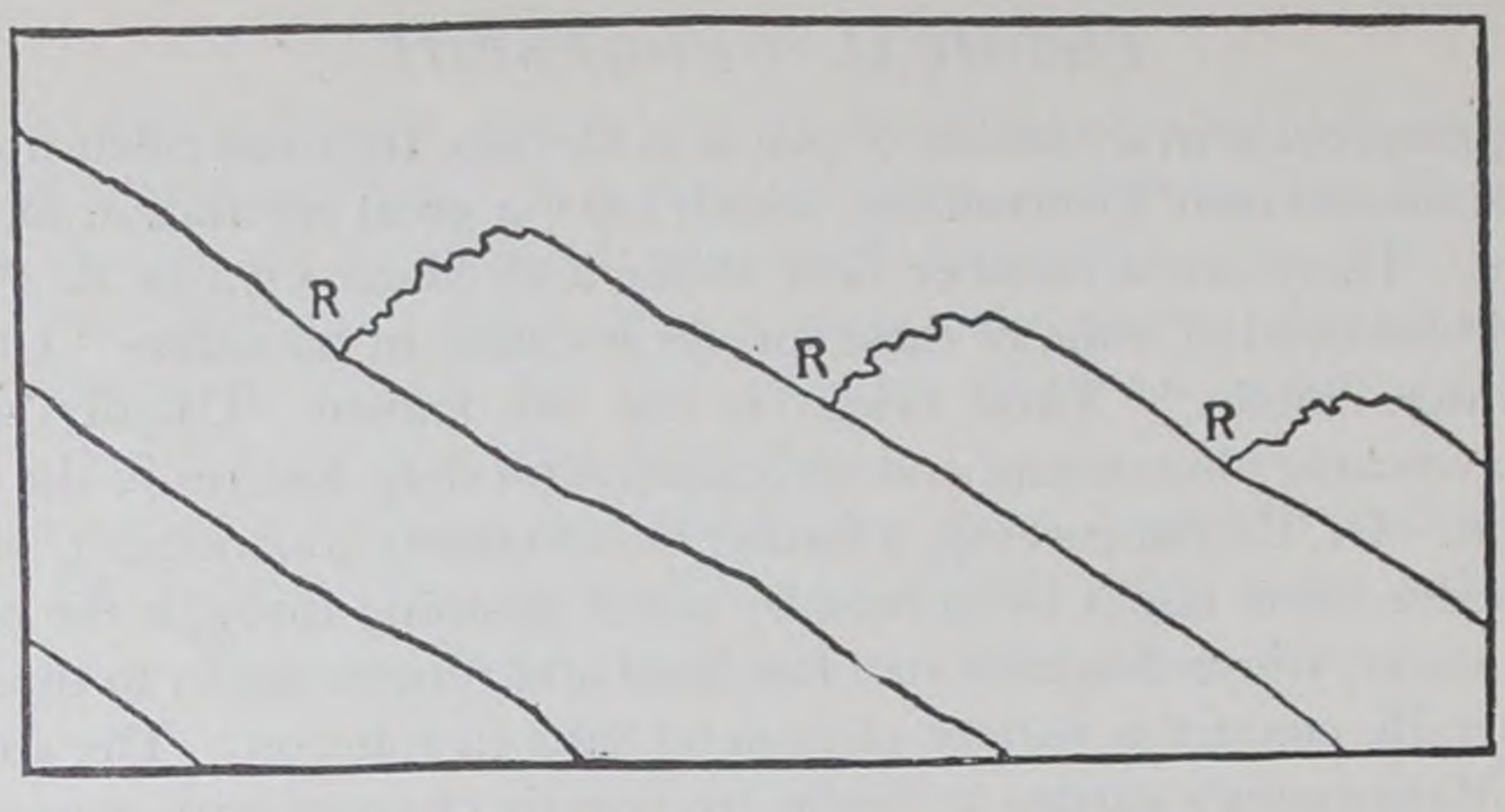


FIG. 52.

The diagram shows how strike valleys are formed in bedded rocks. Rivers would flow along the valleys at the points marked R. The photograph shows a small river flowing along a strike valley. Note smooth surface of rock (on left) which dips below the broken edge of the next bed (on right).

away from the surface and circulates in these holes, gradually enlarging them. Caverns and underground rivers are common, and if the region has a very pronounced slope the surface may become as dry as a desert ; this is what happens in the Karst region, where most of the water flows away underground and comes to the surface elsewhere. The Jaffna Peninsula is, however, very flat and low-lying, and the limestone bed is evidently fairly level ; as it extends under the sea, salt water enters the holes and is drawn into the underground circulation. It is not surprising, therefore, that the wells of this region exhibit great peculiarities. Near Puttur, for instance, we hear of a bottomless well, whose depth has never been fathomed ; there is also a tidal well. Elsewhere we find wells quite a long way from the sea which have salty water, unfit to drink ; while in other parts, *e.g.* at Kirimalai there are fresh water springs on the seashore coming from holes that are not connected with the sea. The conditions are accentuated in some of the limestone islands like Delft, where there is so little fresh water that cultivation is difficult and the inhabitants always have to drink either coconut water or toddy. In the rest of Ceylon wells near the shore are commonly saline, because they are bored through the sandy shore deposits which become saturated with salt ; people living near the shore must, as a rule, get their drinking water further inland, but in the Jaffna Peninsula this is not necessarily the case. As this mass of limestone is so near to sea-level, and in a region of fairly plentiful rainfall, the water level is very near the surface, although the surface itself is dry ; in parts the limestone is below sea-level, and here the water covers the surface, making inland lagoons. These lagoons vary very much in salinity, but there is a great deal of evaporation during the hot days of the dry season and the land round their edges is generally encrusted with salt ; hence the production of salt has long been important in this area. The circulation of water in limestone regions is always exceedingly interesting and the student who follows up this study by actual observation in the field will be amply repaid.

In the hill country where there are veins of crystalline limestone, we also find some of these features, though the rock is very different in texture and structure. The soil, for instance, is much drier than on the surrounding rocks, and rivers are less numerous. A stream may suddenly disappear underground when it runs from the gneiss on to the limestone, or the limestone vein is worn by solution, etc., to a lower level and forms a valley. These interesting regions in the hill country await further study.

One of the chief problems confronting civilised man is that of obtaining a

plentiful supply of good drinking water. There is, perhaps, no other single factor which so profoundly affects the life of man as the quality and abundance of his water supply. Lands are variously endowed with this precious commodity. The desert nomad, living in a rainless land, treasures it like gold ; his chief care in life is to get merely enough to drink, and he regards personal cleanliness as a luxury. On the other hand, there are lands like Assam where man is overwhelmed by the abundance of water which nature pours upon him. There are lands, also, of variable rains, like the "famine lands" of N.W. India, where life is always precarious.

The island of Ceylon is not placed in any of these extreme positions. There is only one portion of the island, that which has over 200 inches of rain (see rainfall map) where life is distinctly uncomfortable owing to the superabundance of water ; this portion was for a long time uninhabited, and would probably have remained so, but for the discovery that tea and rubber thrive there. Much of it, however, is still to-day covered with dense tropical forests. In this region there is everywhere too much water, both for drinking purposes and for cultivation ; drainage is always an important question, and the great problem is how to keep houses, clothes and personal belongings dry. Owing to the warmth and moisture of the air, different kinds of fungus, *e.g.* "mildew", grow with great rapidity, causing textile fabrics, leather goods, etc., to perish. The abundance of springs and rivers, it must be remembered, is partly due to the nature of the crystalline rocks which causes the water to run about over the surface. Were this region composed of rocks of another type, *e.g.* very permeable limestone, the water would quickly disappear, and might even be insufficient for human needs in spite of the abundance of rainfall. As this region is also a great deal more cloudy than the rest of the island, owing to the frequent rising air currents which cause a constant tendency towards precipitation rather than evaporation, there is much less evaporation of surface water by the heat of the sun's rays than in most parts of the island. On the whole the area within the seventy-five inch isohyet has everywhere abundance or even superabundance of water (see Fig. 53).

At the other extreme we find two regions—the Puttalam and Hambantota areas (see rainfall map) where there is a distinct shortage of water. The rainfall here is lower than in any other parts of the island ; the atmosphere is drier and relatively free from clouds, so that there is little to interfere with the movement of radiant energy. Evaporation is therefore very rapid. As the water on crystalline rocks tends to remain near the surface, much of it is quickly lost

by evaporation. So that a rainfall of fifty inches, which would be considered plentiful in the temperate zone (London has only twenty-five inches) is here insufficient for human needs, and man has to resort to artificial means of storing water, while crops are very difficult to produce. These are both regions of poverty for the cultivator.

Moreover, the soil tends to become saline, because the salts in the evaporated water are left behind and accumulate, and this, again, operates against the cultivator. The only important crop which appears to thrive in a somewhat saline region is cotton ; experimental crops are now being tried in the Hambantota District.

There is, however, ample water for the whole of Ceylon if it could be conveyed by artificial means from the better watered regions ; and suitable public works could certainly be devised for this purpose.

In the whole of the area having under seventy-five inches of rain there are long periods in the year when owing to excessive evaporation the water supply is poor. The surface becomes very dry, wells dry up, and people often have to fetch their drinking water from long distances. In these times there is a great danger of typhoid, which is spread by a germ inhabiting foul water. The poor are often reduced to drinking the most unsatisfactory water through ignorance of ways and means of obtaining anything better to drink. The health of the people of villages like Mulliyavalai (near Mullaittivu), Odduchuddan and Mankulam is very seriously affected because, either through ignorance or through necessity, they are often drinking badly polluted water ; fish will not live in the wells, which is a sure sign that the water is foul.

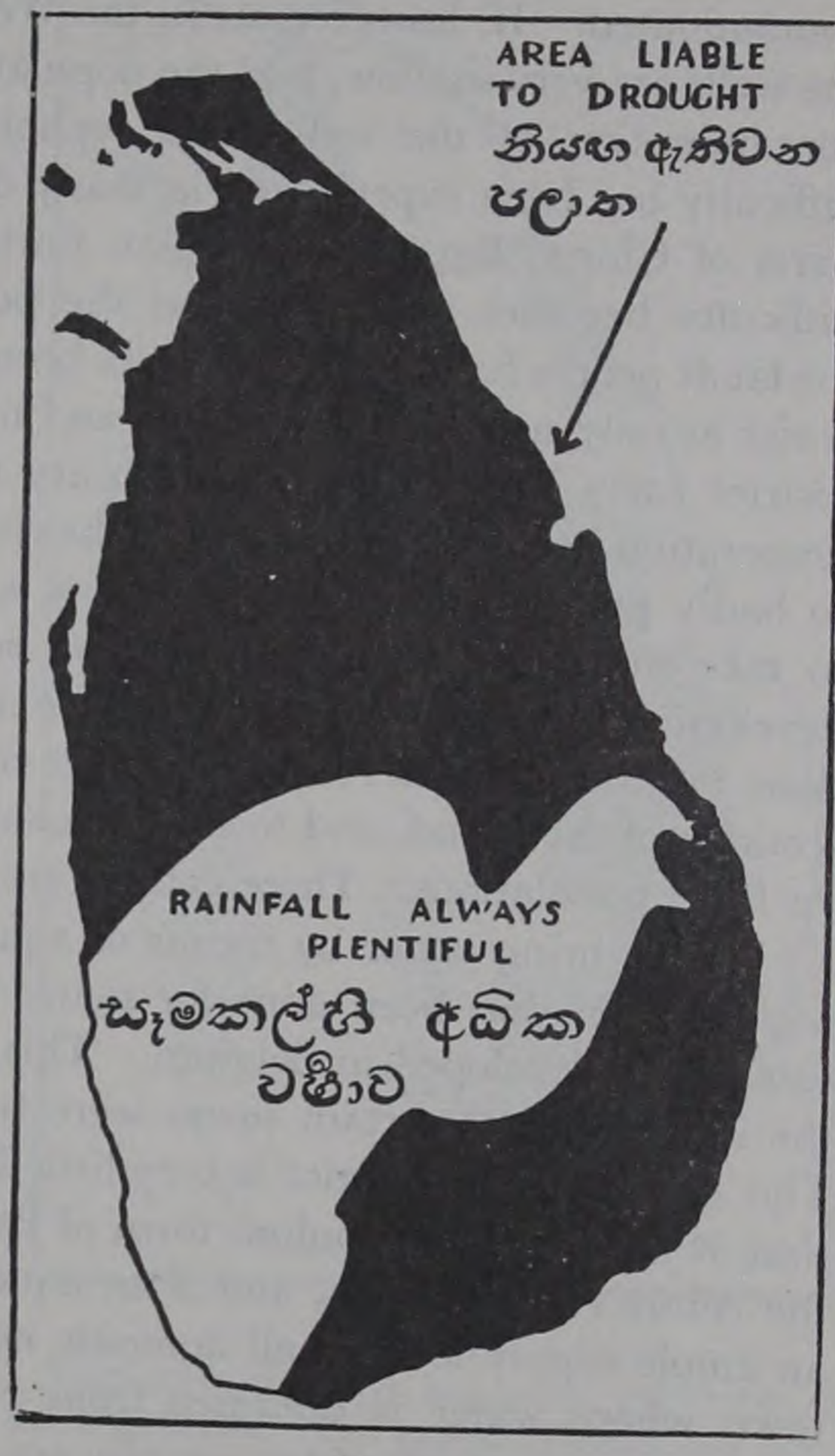


FIG. 53.

It has always been considered dangerous to drink the water of rivers which flow through populous regions, because of the rubbish and sewage that get into the water; as a rule it is preferable to use underground water which has been filtered by passing through the rocks, and is therefore less likely to be contaminated. If, however, as in the Western and North-Western Provinces, the wells are very shallow, and the population dense, it is very difficult to avoid contamination of the wells, and typhoid becomes a grave menace. This difficulty has been experienced in many densely populated regions, such as in parts of China, Egypt, the Belgian lowlands, and the London Basin. The difficulty becomes accentuated as the population increases. In the Belgian lowlands people have for many years been obliged to drink beer, and to regard water as only suitable for washing, and not for drinking, while in the London district early in the nineteenth century the inhabitants reached the point of desperation because the water from the river gravels of the Thames had become so badly polluted that typhoid was an alarming menace; they were obliged to take steps to get water from other sources. As this condition is rapidly developing in Ceylon, it will be well for students to take stock of what has been done in other countries in order to get rid of typhoid, now one of the greatest scourges of the island, and to study means of providing suitable drinking water for large populations. Three courses are usual in such circumstances.

(1) To bring water by means of aqueducts from less populated mountain regions; this has been done for many large British towns, and is now very extensively developed in Belgium. This should be easily possible in Ceylon if the inhabitants of certain towns were better organised for local government. The Adam's Peak District is very little inhabited, and has much more water than it needs. The populous town of Panadure is only about forty miles from the Adam's Peak region, and if an aqueduct were constructed it could bring an ample supply to meet all domestic needs. At present Colombo is the only town where water is obtained from a considerable distance, but proposals for improvement of water supply are now receiving increased support in many of the smaller towns, and will doubtless result in changes in the near future.

(2) The boring of deep or artesian wells into other strata below the surface, which have collected water draining underground from another region, as in the London district. This is impossible in Ceylon, because there are no variant layers of rock, and the crystalline rock goes down to a very great depth.

(3) The organisation of preventive measures to deal with the disease itself,

About fifty years ago a number of celebrated doctors in Western Europe, notably Pasteur in France and Lord Lister in England, made some important discoveries which resulted in the extermination of typhoid in several countries. With the aid of the microscope they repeatedly detected in foul water and impure milk, minute organisms which were also to be found in the bodies of people suffering from typhoid. They pointed out that the disease could only be eliminated by the initiation of a system of strict Government supervision of all supplies of milk and water, so as to ensure absolute cleanliness and purity; at the same time the public should be instructed through the newspapers in the reasons for these measures. This has been more thoroughly carried out in Britain than in any other country in the world, and in recent years typhoid has become a rare disease, though it was formerly quite as common as it now is in Ceylon.

FIG. 54.

Map showing crude death-rate per 1000 of the population. The causes of death are very complex; typhoid fever is amongst the most important.

Black shading = over 40 per 1000.
Close lines = 40-60 „ „
Wide lines = 20-40 „ „
Blank area = under 20 „ „

The death-rate in Ceylon is relatively high, especially in certain areas, and typhoid fever is one of the most important causes of death, so that there is a great need for the study of the water supply by the younger generation. This can only be satisfactorily understood by taking into account all the geographical features of the island.

Ceylon has an enormous number of rivers. A detailed map at once reveals the fact that the island has a network of streams too numerous to count. No

part of the island is without rivers, while in the wettest regions they become innumerable. This is a result of two causes :

(*a*) The impermeable nature of the crystalline rocks, which causes a large proportion of the rain to flow off over the surface.

(*b*) The high rainfall over much of the island, and especially on the edge of the hill country, where most of the rivers rise.

The rivers are remarkable more for their number than for their size. Only one, the Mahaweli Ganga, exceeds 200 miles in length, though there are a large number exceeding sixty miles. The Mahaweli Ganga (206 miles) is just a little shorter than the Thames (225) miles), but only about one-eighth the length of the Ganges. The following table shows the sixteen principal rivers with their respective lengths in miles :

THE CHIEF RIVERS OF CEYLON.

	Miles.		Miles.
Mahaweli Ganga -	206	Menik Ganga - -	81
Aruvi Aru - - -	104	Maha Oya - -	78
Kala Oya - -	97	Kirindi Oya - -	73
Yan Oya - - -	94	Kalu Ganga - -	70
Kelani Ganga - -	90	Gin Ganga - -	70
Deduru Oya - -	87	Kambukkan Oya -	70
Maduru Oya - -	86	Mi Oya - - -	67
Walawe Ganga -	83	Gal Oya - - -	62

(For the benefit of foreign readers of this book we might add that the words " Ganga," " Oya," and " Aru " all mean " river," the two former being Sinhalese words and the latter Tamil. " Oya " is more generally employed for the smaller rivers, while " Ganga " is used for the bigger ones.)

Though not remarkable for their size, the rivers of Ceylon are indeed remarkable for their beauty. The wild magnificence of some of the deep gorges which they traverse in the hill country is rivalled in the low country by delightful reaches of peaceful palm-fringed water, or by the placid lagoons at their mouths. The rivers of Ceylon offer an alluring charm to all who love the beauty of the tropics. They were, however, in the past, so infested by crocodiles that children were brought up to fear their limpid waters, which were dangerous even to the occupants of boats. So that at present, though the rivers have been largely cleared of crocodiles, Sinhalese children are not encouraged to swim unless they are to become fishermen, and are only allowed to bathe in certain recognised

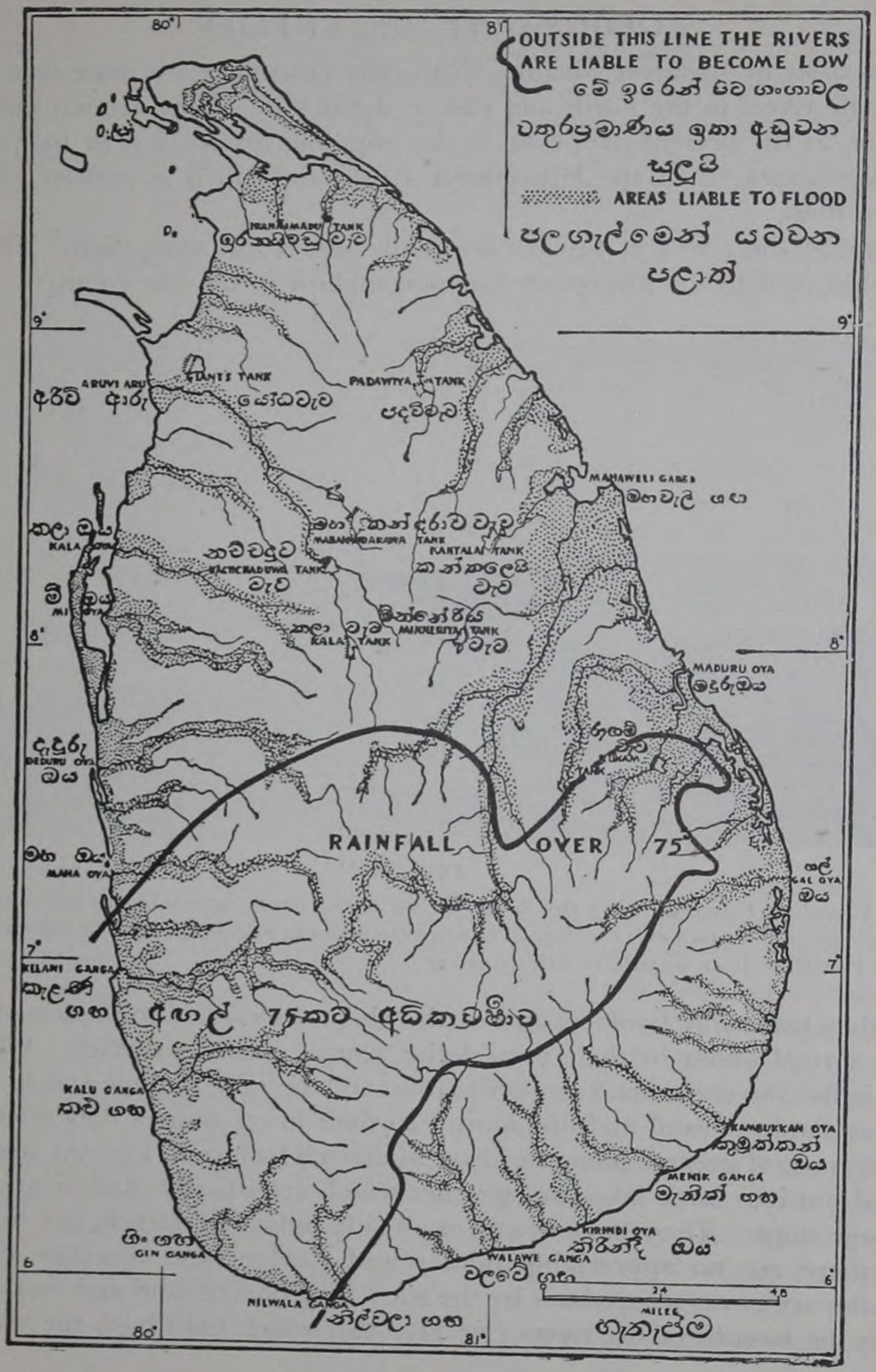


FIG. 55.

The Rivers of Ceylon.

[Owing to small size of map the areas liable to flood are exaggerated.]

shallow spots by the river's brink. Naturally crocodiles are more common in the jungle rivers in the north and east of the island. They are not unknown, however, at the present day, even in the populous areas ; *e.g.* in 1925 a large crocodile appeared in the Hikkaduwa River and killed a woman who was bathing there.

None of the rivers of Ceylon are really useful for **navigation.** They are either too swift in the hill country, or too shallow in the low country. In the

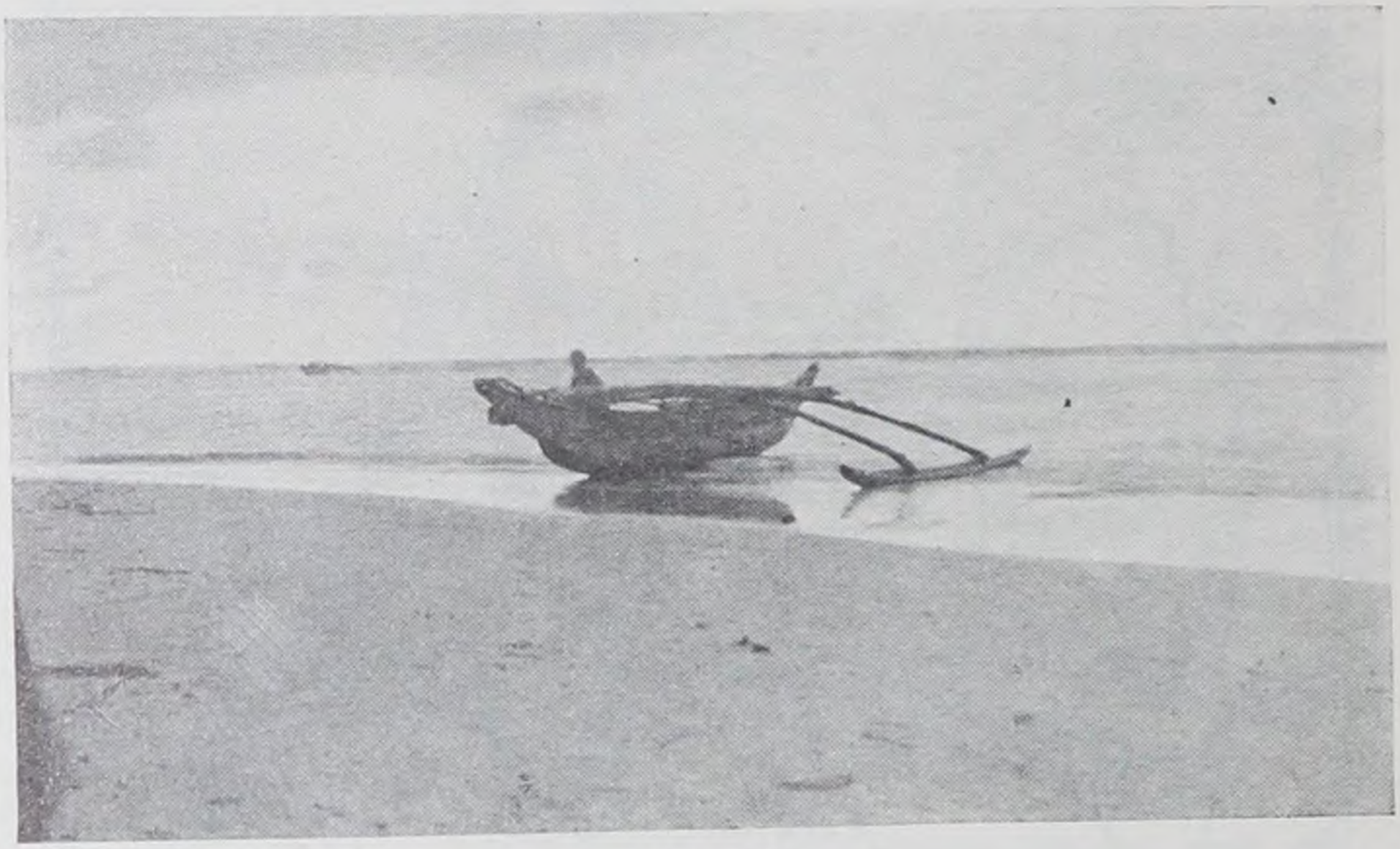


FIG. 56.

Panadure Estuary. Note the sand bar, in background, which blocks the opening, leaving only a small exit for ships. Outrigger canoes are generally seen in the estuary, as Panadure is an important fishing centre.

hills they tear away boulders and earth, which are carried to the lowlands and there spread about in their meandering course over the surface. Where the land is flat the rivers tend to spread out and become shallow and to develop moving banks of sand and fine mud. In their lower courses they often divide up into several streams (note the lower Mahaweli Ganga on Fig. 55), and finally spread out into large lake-like stretches which are equally shallow and useless for large ships. These lagoons are, as already indicated, largely due to the fact that there are no appreciable tides round Ceylon, and therefore the river estuaries are never scoured out by the sea ; long bars of sand and mud develop across the mouths of the rivers (see Fig. 56), which hold back the water and

make it spread out behind the coast, forming these lagoons, many of which are of considerable size. They are useful for fishing, but in many parts, especially along the east coast between Pottuvil and Trincomalee, they form a serious obstacle to communication, particularly when the rivers flowing into them are in flood.

All regions of high temperature are liable to sudden very violent showers of rain ; it has already been pointed out that it is possible in Ceylon to have as much rain in one day as London has in a whole year. Rivers in such regions are always liable to sudden **floods**, and people as a rule avoid building their houses too near them. This is everywhere the case in Ceylon. There are not many parts of the island, however, where river floods form a serious obstacle to the development of the land, provided suitable precautions are taken. Bridges, for instance, must be made higher and very much more massive, so as to allow for the passage of flood waters. The most serious floods occur in the lower reaches of the Mahaweli and Kelani Gangas. In spite of extensive drainage schemes, floods frequently cause serious damage to the low parts of Colombo, while there are a number of stretches of road in the upper Kelani and Kalu Gangas that are not dependable in wet weather. Near its mouth the Mahaweli Ganga divides into many streams and from Trincomalee southwards along the coast there are often extensive floods which render the road to Batticaloa impassable.

On the other hand, there are times when many of the rivers are almost **dried up**. Those which receive the enormous supply of water shed along the southern and western flanks of the hill country during the south-west monsoon period have a fairly regular flow ; but in the northern and eastern lowlands during the same period the rivers become very low (see Fig. 57). The latter rivers rise to their greatest height when the rains from the north-east monsoon are most in evidence. During the Kataragama pilgrimage season the Menik Ganga is nearly aways low enough for the pilgrims to wade through quite easily, while when the rains are strong near its source it will become a roaring torrent.

Many of the rivers in the black shaded area on Fig. 53 are reduced to a sandy bed over which meanders a small trickle of water from about June to September. At this time of the year travelling is much easier in the jungles ; the drought reduces the malarial mosquitoes which almost entirely disappear, and the climate is dry and bracing.

The ancients provided against the drought by constructing their magnificent

series of tanks, and thus were able to live in the more bracing part of the island. These storage reservoirs, called "tanks" by the English, "Wéwa" by the Sinhalese, and "Kulam" by the Tamils are one of the most remarkable features of the island and have greatly modified the river system. In order to

FIG. 57.

Bridge over the Kala Oya. When the river is in flood the bridge is only just big enough to span the water.

understand the system it is necessary to study the one-inch survey maps on which both the abandoned and the recently used tanks are all shown in great detail. They vary in size from tiny ponds belonging to single cultivators up to large lakes several square miles in area which would water the paddy of a whole village. Almost every river and tributary was utilised in the drought zone, so that all the tanks of one river system were connected. A large earth barrage was constructed across the valley—so skilfully that most of them have

been preserved and appear to be natural features of the landscape, and thus what looks like a natural lake was formed. Curiously enough Ceylon has very few natural lakes; the Kandy and Nuwara Eliya Lakes are all artificial. Some idea of the system can be gained from the accompanying diagram traced from the one-inch map, which shows the abandoned tanks on part of the Upper Menik Ganga. Some of the larger river systems contain several thousands of tanks. The total number probably exceeds twelve thousand. The proportionate number of tanks on the large sheets of the survey maps is shown in the accompanying diagram. A diagram and photograph of Nachchaduwa tank are given in Part IV, Chapter 4.

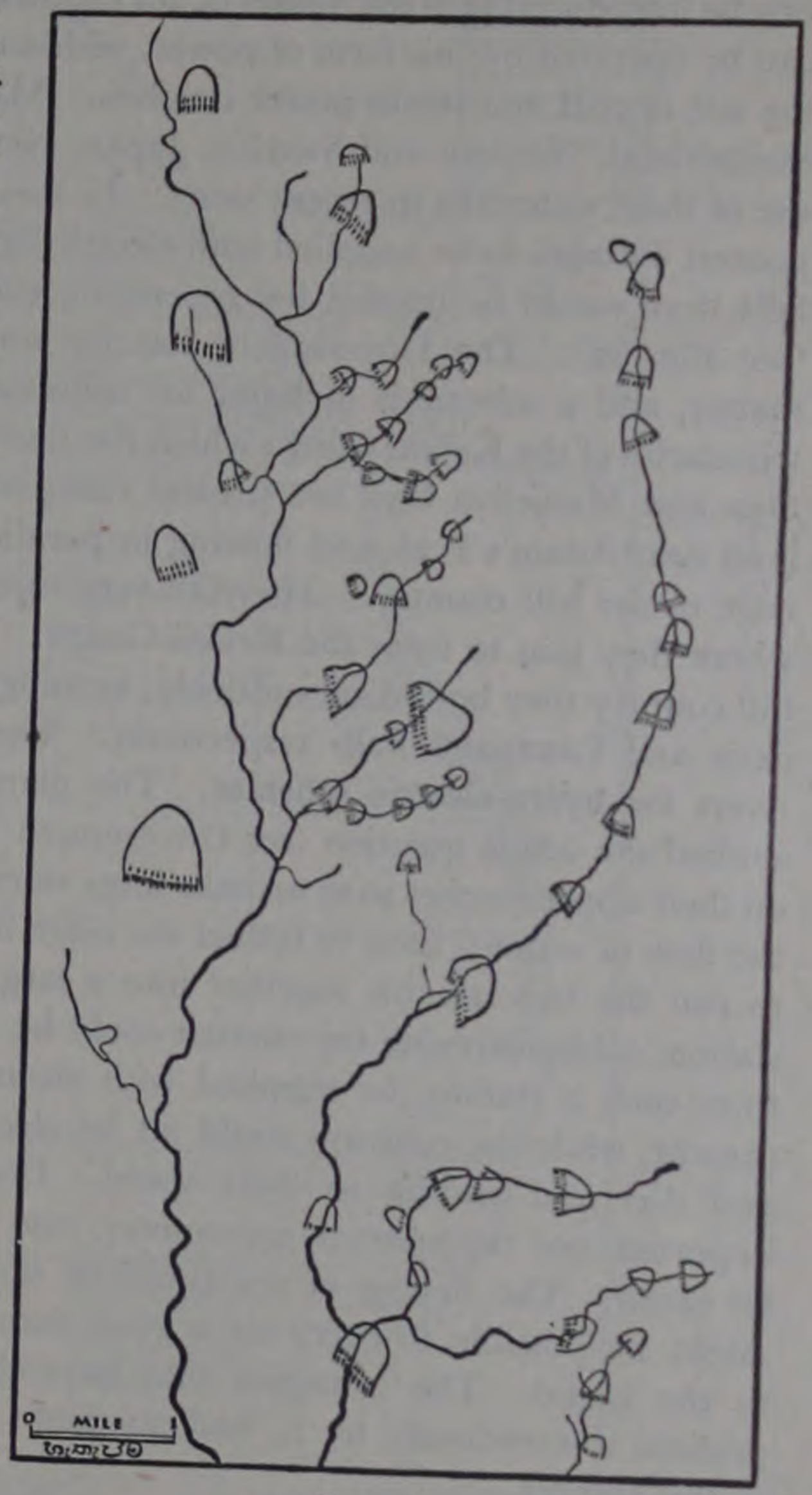


FIG. 58.
Abandoned Tanks on the Upper Menik Ganga.

Though the rivers of Ceylon are not of much use for navigation, they are very useful for fishing, quite a large supply of fish being obtained from the inland waters for local use by the villagers, though it does not enter into trade. There is, however, another use to which they might be put, and which is now under consideration. In the hill country, there are abundant waterfalls, and these might be used for the generation of electricity. The discovery of the use of electric power has proved one of the most beneficent gifts of modern science. It enables people to have at a cheap rate

the best form of lighting, which can be called into use at any moment. Cooking can also be done by electric heaters, and electric fans for circulating the air can be introduced into the houses of hot countries. In addition to this, factories can be operated by this form of power, without the smoke, heat and dirt which the use of coal and steam power involves. Many mountain countries, such as Switzerland, Norway and Sweden, Japan, New England (U.S.A.) have made use of their waterfalls in recent years. In these lands it is possible for even the poorest cottages to be supplied with electric light. Ceylon has far more waterfalls than would be needed for generating enough electricity for all purposes (see Fig. 60). The Government has for some years been considering this matter, and a scheme is in hand for utilising the falls on two of the upper tributaries of the Kelani Ganga which rise near Adam's Peak. The Kehelgomu Oya and Maskeliya Oya are streams rising at about 6000 feet in the plateau land near Adam's Peak and flowing in parallel valleys which converge on the edge of the hill country. They fall very rapidly to a height of only 400 feet, where they join to form the Kelani Ganga. As they approach the edge of the hill country they both drop suddenly, forming magnificent waterfalls, the Aberdeen and Laxapana Falls respectively. These seem to be the most suitable rivers for **hydro-electric schemes.** The plan projected by experts who have studied the whole question (see Government Publications) is to construct dams on their upper reaches so as to make large storage reservoirs by which to regulate the flow of water ; then to tunnel the ridge between them, above the falls, and to run the two streams together into a large generating station. From this station, cables carrying the current could be run to all parts. Colombo could, from such a station, be supplied with electricity much more cheaply than at present, while the railways could all be electrified, thus abolishing the smoke and dirt and adding to their speed. Coal for the railways need not be imported nor transported up-country, and in this way much money might be saved. The drying of tea could be done by electrical machines, and it might be possible to carry on a good many industrial enterprises profitable to the island. The countries that have developed electric power have all profited tremendously by it, and no doubt there is a great future for Ceylon in this respect.

The promising Laxapana scheme, which was initiated in 1920, is now under execution. The first stage of the scheme, which is to yield 25,000 kilowatts, is expected to be completed by 1950.

The hill country abounds in **waterfalls** of remarkable beauty. The names

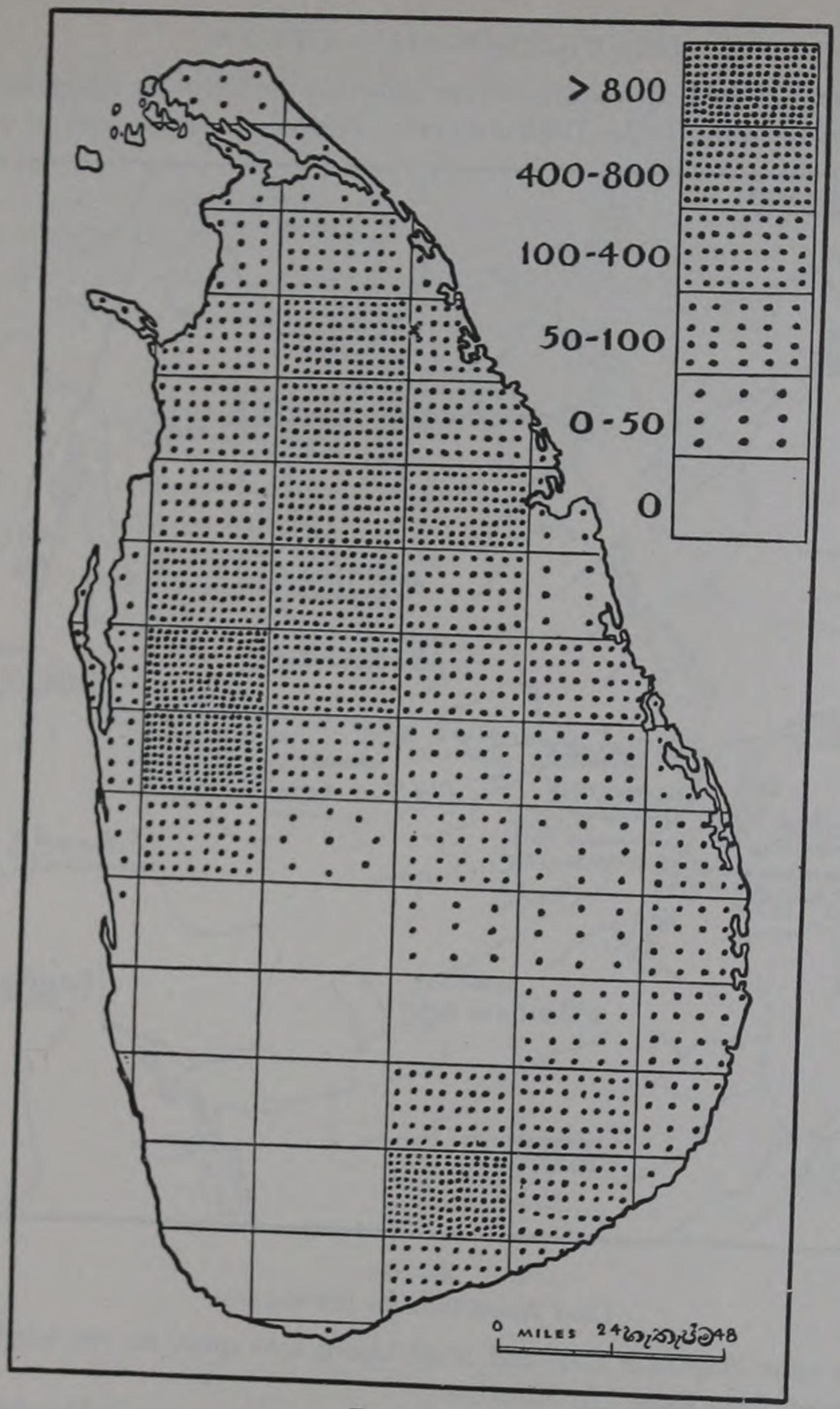


FIG. 59.

Map showing the relative number of storage reservoirs [in use, and abandoned] indicated on the sheets of the one-inch Survey Maps.

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and situations of the best-known falls are shown in the following diagram. One of the most beautiful is the Diyaluma fall. It drops over the wall of the hill

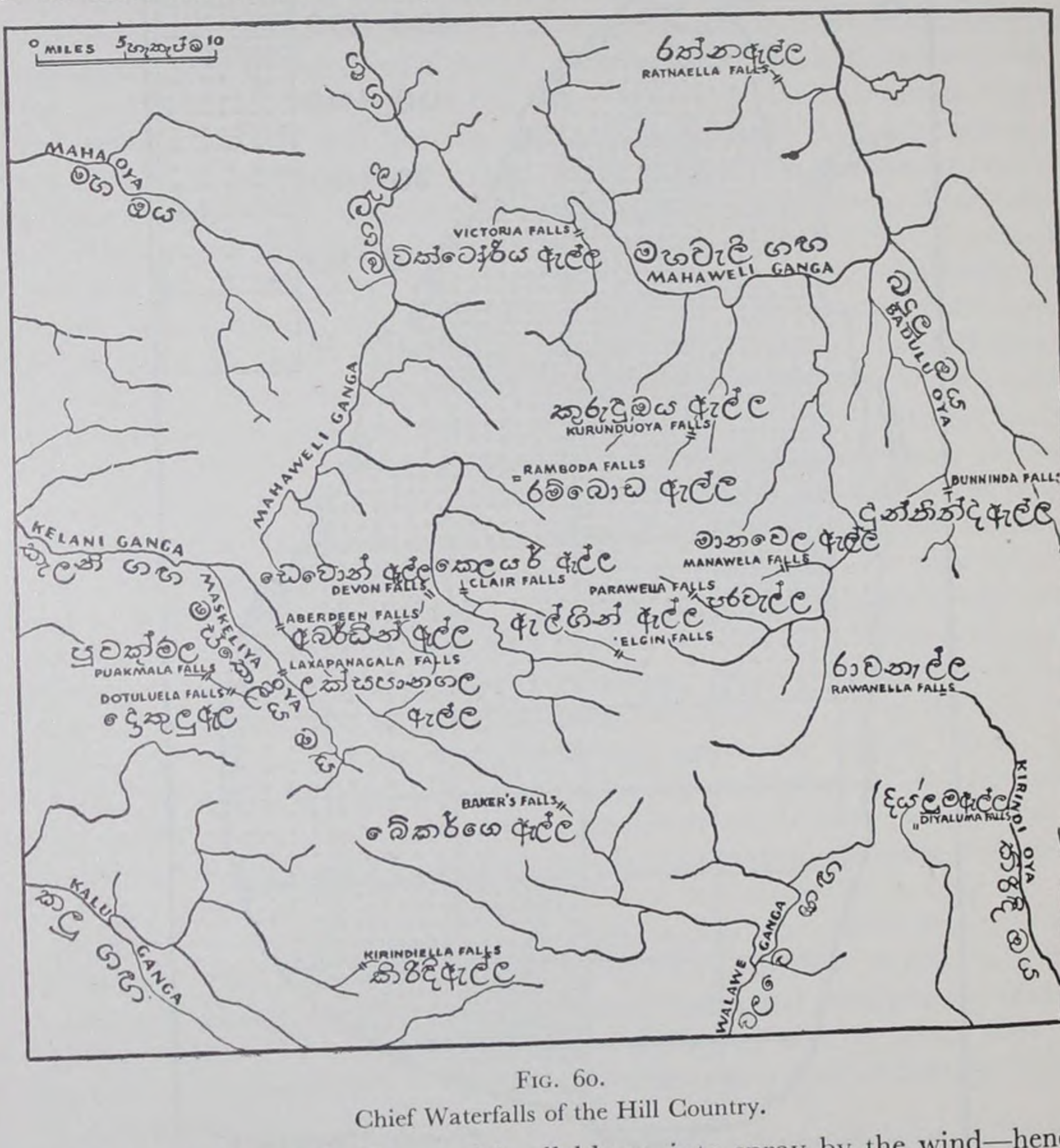

FIG. 60.

Chief Waterfalls of the Hill Country.

country near Haputale Gap and is all blown into spray by the wind—hence the name " Dust Falls " in Sinhalese.

There is such an abundance of natural waterways in Ceylon that canals can never be much needed, except to improve the navigation of certain

rivers. Those which do exist were mainly constructed by the Dutch, who brought with them to Ceylon the settled habit of canal construction, which they had developed in their own country. Most of them are near the west coast, and have been made, as in Colombo, to carry off flood waters, or to connect useful stretches of water, *e.g.* to connect Puttalam Lagoon and Negombo Lake with the mouth of the Kelani Ganga. The total length of navigable canals is 153 miles. A list of the canals is given below.

Name of Canal.	Length in Miles.
Toppu to Andiapane Lake - -	42
Boat Canal, Jaffna Lake - -	40·75
Andiapane Lake to Puttalam -	18
Colombo to Bolgoda - - -	16
Colombo to Pamunugama - -	9
Old Hendala Canal - - -	7·20
Bolgoda to Galapota - - -	7
Negombo to Kammal - - -	5
Ja-ela Canal - - - -	3
Canal to Nachchikali salt pans -	2
Talpitiya flood outlet - - -	1·82
Kirillapone Canal - - - -	1·25

PART II. CHAPTER 10

VEGETATION OF CEYLON

Ceylon is included in the Asiatic floral region, which has a series of plant types completely different from those of the surrounding continents of Europe, Africa, or Australia. The traveller from Europe, who is well acquainted with the plant types of his native land, finds on arrival in Ceylon that he can hardly name a single plant outside the important cultivated crops. A large number of natural orders represented in Europe are completely absent and replaced by others which are peculiar to Asia. The vegetation of Ceylon is very similar to that of South India, all the chief forms being continuous ; it has, however, a few forms which are not found in India. The first fact suggests that Ceylon was once joined to the mainland, though the second seems to indicate that the severing of the island took place a very long time ago—long enough for new plant forms to have developed.

Vegetation depends mainly upon four factors :

1. Soil.
2. Rainfall.
3. Temperature.
4. Light quality.

In Ceylon the other factors differ so little over the whole island that it is chiefly the rainfall that determines the nature of the vegetation of particular areas. The subsoil formed by the crystalline base tends to develop similar soils everywhere. Slight differences are produced by the changes in composition in the crystalline mass, but the main differences in the quality of the soils seem to be produced by the differing amounts of water available for the various chemical processes which go on just under the surface of the ground. This, of course, is a question of the effect of rainfall. Broadly speaking, therefore, the key to the different vegetation regions is the rainfall map.

Though about four-fifths of the island is at present uncultivated, very little of Ceylon has its original natural vegetation. Since the time of Vijaya's landing

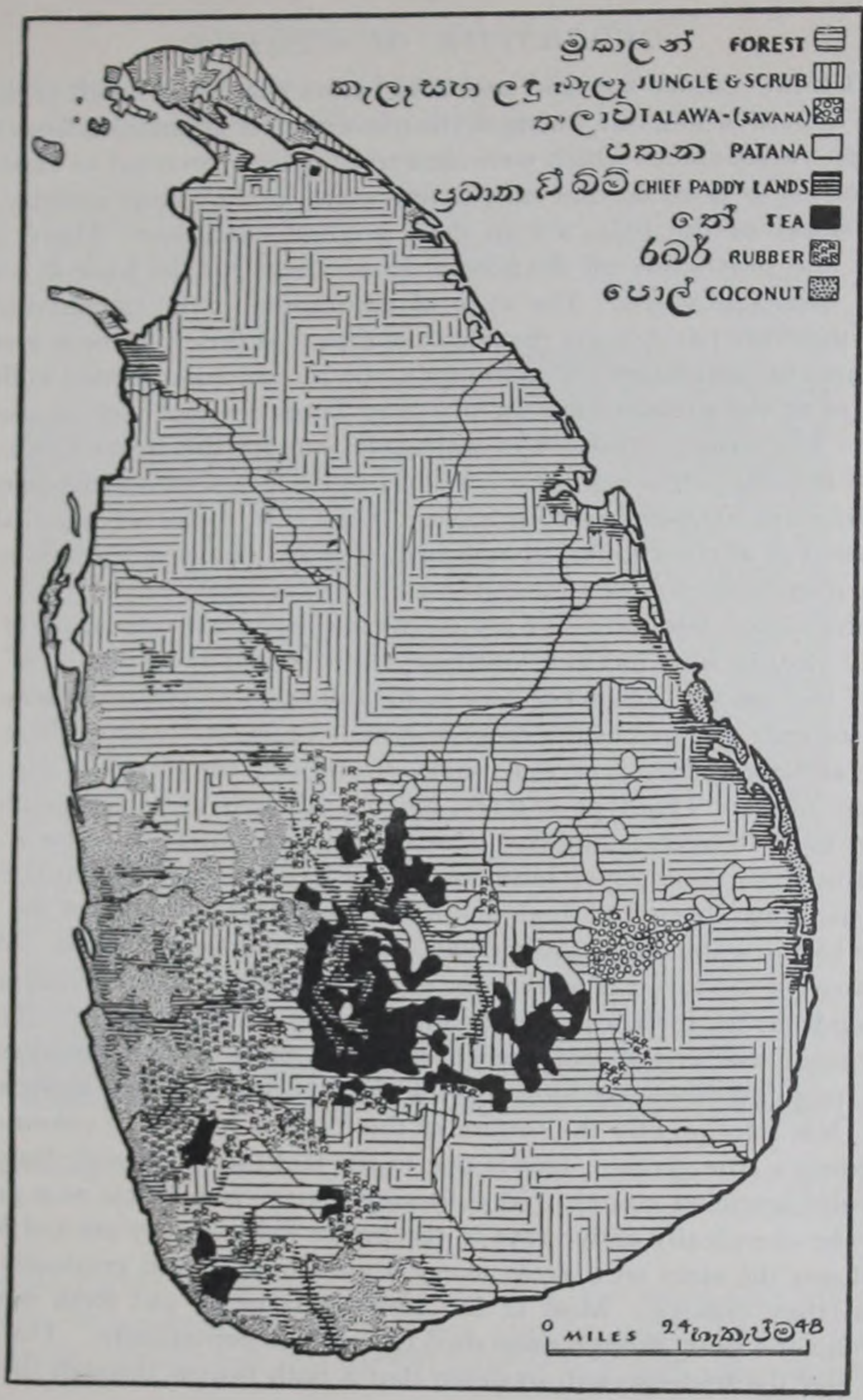

FIG. 61.
Vegetation of Ceylon.

about the sixth century B.C. and probably before that date, much of the island has been in cultivation, but, owing to the movement of population from one part to another, various lands which were cleared have later reverted to their natural condition. It is possible that only a few areas in the whole country, on the steepest slopes of the hills, are in their original condition. There is ample evidence that practically all the present low-country jungles have at some time or other been cultivated. The type of vegetation in the uncultivated areas depends therefore partly upon the length of time that they have been abandoned by the ancient cultivators. For instance, the recently abandoned coffee plantations are at the present time mainly grass lands covered with coarse grasses and a few low trees ; it takes a considerable time for the larger forms of vegetation to develop when once the surface has been to some extent dried owing to the drainage arrangements on a plantation. On the other hand, there are lands near the ancient tanks, abandoned, perhaps, for over a thousand years, which are covered with dense jungle.

On the whole, tree forms are dominant in the natural vegetation of Ceylon, and they vary in size, number and type according to the amount of rainfall. Some of the species, however, vary with altitude. Where the mean annual rainfall exceeds 150 inches the most luxuriant vegetation exists ; here we find the true **equatorial forest**, or wet jungle, resembling the forests in the Amazon or Congo basins. This type of forest has the tallest trees, is practically always wet, swarms with leeches, and has dense creepers climbing up the trees, hanging in curtains from their upper branches ; tree ferns are of frequent occurrence, as well as many species of rhododendron ; there are varieties of the graceful bamboo by the watercourses, as well as a number of different palms. While the appearance of the forest is outwardly the same, species vary with altitude ; the rhododendron, for instance, belongs mainly to the highest slopes. The dominant type of tree is tall and spreading, with small, dark, evergreen leaves. Fig. 38, page 98 shows the forest on the slope of Adam's Peak as viewed from above. Not infrequently the surface of the forest is reddish in colour—it is, in fact, seldom a true green. This is due to the fact that the young leaves at the ends of the branches contain red colouring matter which acts as a protection against the chemically active rays in the bright light. They are red for about a foot down the stem on a great many tropical plants, and gradually become green as they enlarge. Most of the trees continue to put forth new shoots throughout the year, though some shed their leaves periodically. The trees are so high and the undergrowth so dense that a path beaten through the forest is

more in the nature of a tunnel. The forests of Sabaragamuwa and the slopes of Adam's Peak are typical. The most luxuriant forests occur in the region

FIG. 62.

Forest along Banks of Kirindi Oya in August. Away from the river the jungle is dry. Note curtain of creepers hanging from trees; the dry stream-bed in foreground, as it is in the drought season.

most affected by the south-western monsoon—*i.e.* the south-west edge of the hill country—and correspond to what are usually called the wet monsoon forests of India. Proceeding into the hill country in a north-east direction, we

find that many of the rainy slopes of the hills, even outside the 150 inch isohyet are clothed with similar forests ; they also extend along the moist river valleys in the drier regions. The only virgin forests in Ceylon are probably in these wet areas.

On the accompanying vegetation map the forests are not classified. Many of the typical wet forests lie in the areas where most clearings have been made

FIG. 63.

Scrubland or Dry Jungle. Note the leafless thorny plants in foreground.

for rubber and tea, and since the map has been so greatly simplified some of them lie actually in the portions marked as being under those crops. Their area is being greatly diminished in modern times because these wet slopes have proved to be the best regions for rubber and tea. Though there are many trees which might be used commercially, their timber has not as yet been much exploited, on account of their inaccessibility, as compared with the lowland forests.

In the areas marked as " forest, jungle and scrub," on the map there are various grades of tree growth which alter with the rainfall and time of growth

since clearing. It is difficult to distinguish separate types as they shade off one into the other. At the opposite extreme to the " wet " forest is the dry jungle, or scrub. This type can best be seen in the areas within the fifty inch isohyet, *e.g.* in the neighbourhood of Hambantota or Puttalam, or in the extreme north near the Jaffna Peninsula. Here the growth is usually quite thin, the trees are much further apart, have fewer leaves, are often covered with spines, and many of the plants are adapted to drought. One of the most typical trees in the dry

FIG. 64.

Prickly Pear and Cactus-like Plants on the Jaffna Limestone. Inferior Palmyra Trees in background.

jungle is an acacia with very large spines and hardly any leaves, and beautiful pink or yellow flowers. For the greater part of the year the dominant colour of the plant growth is grey green. Many of the leaves and stems are silvery in colour. In the driest parts there are even quite a number of cactus-like plants and the prickly pear ; there are also certain creepers, which resemble the cactus. The various **adaptations of plants to drought** are exceedingly interesting and may be easily studied in these regions. A special group of plants of exceptional interest is to be found on the dry limestone of the Jaffna Peninsula, in the patches which are too dry for cultivation. When a plant wishes to

protect itself against drought the main object is to check the mechanical process called transpiration by which water vapour is given out through the leaves. The more important devices for this purpose are as follows : reduction of leaf surface, *e.g.* many acacias produce no leaves ; protective covering of the pores of the leaf by hairs (as these are often white, they cause the plant to look silvery in the bright light, if they be on a greenish grey leaf surface) ; pores hidden in deeply grooved stems (as in the cactus-like creepers) ; arrangements for water storage, as in the prickly pear ; leaves placed edgeways to the sun, so as to avoid the direct rays, as in many acacias—(the smaller the angle of incidence of the sun's rays the less are they concentrated on a unit of leaf surface and the less is their intensity).

Even in the areas with a moderately high rainfall, between the isohyets of fifty inches and seventy-five inches a great many of the plants are adapted to drought, owing to the fact that during the seasons of decreased rainfall between the equinoxes the evaporation is so great as to make the rainfall entirely ineffective ; during these periods the ground becomes exceedingly dry, a large number of wells dry up, and the forests often present the appearance of those of the temperate regions in autumn. Large numbers of the smaller plants die off, and the whole vegetation assumes a parched appearance. The north-eastern forests become so dry during the period when the rainfall of the island is mainly concentrated on the south-western side of the hill front that mosquitoes are almost entirely absent, even though in the wetter parts of the year these areas are the most malarial.

Near the salt-pans of Hambantota, Puttalam and Elephant Pass the trees become exceedingly small, and in the saline soil very few plants will grow ; here we have a very specialised group. There is some amount of poor pasture suitable for goats and cows, consisting of small grass-like plants, but in the most saline area peculiar thorn-plants are scattered over the ground at intervals. Ceylon offers special opportunity for the study of the effect of drought upon plants, because it exhibits such wide differences within a small area. For example, in the small space of about thirty or forty miles between Hambantota and the Sabaragamuwa hill country all the types of growth which have been mentioned can be seen. Similarly, on the railway journey from Kurunegala to Jaffna the gradual changes in the forests are easily observed from the train.

The most important timber is found in the intermediate type of forest midway between the dry and the wet types. Here we find satinwood, ebony, nedun, and palu, a species of ironwood. The most useful timber-tree for every-

day purposes in Ceylon is the jak, which grows in the moist lowlands in the south-west quadrant of the island. This remarkable tree, so useful also for its gigantic fruit, which is one of the chief staple foods of Ceylon, has, like the breadfruit, been somewhat improved by cultivation ; some very fine specimens can be seen in the gardens of the Western and South-Western Provinces. The leaves form a favourite food for goats. Amongst the trees of the hill country the grevillia, dadap and several others have been singled out for producing shade on the tea plantations on account of their light, leafy growth. Apart from timber, there is very little of known economic value in the forests of Ceylon.

The coco-nut, which with the palmyra of the north and east has come to be considered so typical of Ceylon, is never found in the wild state. Both these plants have been cultivated from the earliest times and though they require but little attention will not grow apart from the care of man. Both thrive best in the sea air and on a somewhat sandy soil, and they are seldom found very far inland. Though the palmyra has always been traditionally associated with the Jaffna Peninsula, it is now being to some extent displaced by the coco-nut on account of the superior value of the nuts for commercial purposes ; large plantations of coco-nut are now doing quite well in the eastern portion of the Jaffna Peninsula. The rubber tree now cultivated in Ceylon is not native to the island but has been imported from the Amazon forests. A number of the trees in the wetter forests of the island yield rubber, but of quality and quantity inferior to that of the Para rubber tree. The remarkable banyan tree is found here and there in the moister lowlands, but never in great numbers. It spreads to a miniature forest by sending down roots from its branches.

The forests of Ceylon contain a very large number of different species of plants, many of which have been neither studied nor classified. The most comprehensive study of Ceylon flora is Trimen's " Flora of Ceylon," which can be consulted in Colombo Museum Library. It is, however, a mere beginning and much more work is waiting to be done. The smaller plants of the jungle provide food for the many wild animals, but they are unknown to the majority of the inhabitants. Those who know them best are perhaps the Ayurvedic physicians, who obtain most of their remedies from the jungle plants and have their own scheme of names. The moist low country below 3000 feet in the south-west, appears to contain the greatest number of plants which are peculiar to Ceylon.

The vegetation map accompanying this chapter has been compiled from a series of separate province maps which were made over a long series of years and

completed several years ago. It is not easy to understand how the various surveyors distinguished between what they called " forest " and " jungle and scrub " respectively. The classification seems to be based partly on the size of the growth ; the " jungle and scrub " is also possibly what appeared to them at the time to have the drier and more ragged appearance. This map is only to be regarded as a rough indication of the vegetation types. Where a large proportion of the land is under a particular crop the natural vegetation is not shown. Most of this land was formerly forest or jungle.

Reference has already been made to the fact that much of the land now under forest has in the past been cultivated. Apart, however, from such areas as the regular paddy lands near the tanks, there are large portions of land which have from time to time been cleared of forest for short periods under the system called " **Chena cultivation.**" This is one of the most primitive forms of agriculture and has been carried on mainly by the less developed people. It has also been used by the settled villagers adjoining the jungle areas as a temporary means of supplementing their food supplies. In the past there was attached to many villages a portion of land where the villagers had the recognised right of Chena cultivation. As they did not always claim this right, their tenure of the land was somewhat loose and has been lost sight of by the government, and many of these regions have been given over to tea or rubber planters, thus greatly impoverishing some of the villages. The ordinary Chena cultivator who moves about within the jungles in the most remote parts of the island has as yet met with but little interference excepting through the setting apart of land by government as game sanctuaries ; the chief of these are the Wilpattu Sanctuary near Puttalam, the Yala Sanctuary near Tissamaharama and the shooting reserve north of Polonnaruwa. The Chena cultivator burns down a portion of the jungle, which he roughly clears ; he then with quite primitive implements scratches up the surface soil and sows his seeds, usually millet, maize, gingelly, pumpkins, brinjals, and sometimes chillies. The most common form of millet in use is a very small-seeded variety called Kurakkan, which grows easily but is of inferior food value. His aim is to get food with as little trouble as possible. While the crop is growing very little attention is paid to the plant itself. The great work is to protect it from the ravages of wild animals. Elephants taking a stroll across the little crop will trample it down in a single night ; jungle hogs will burrow into the ground with their snouts and uproot it speedily. It is therefore usual to erect a small hut in the trees, in which one member of the family watches every night, making noises to scare away the animals with a collection of old tin

cans strung on a rope which is stretched across the little plot ; the watcher by tapping the rope makes the articles knock one against the other. Drums and other musical instruments are also used for the same purpose. In the fresh soil, fertilised by burnt plant remains, the plants grow so rapidly that several crops can be raised during the year. The same plot, however, is not used many times

FIG. 65.
Abandoned Chena.

before it is abandoned for a fresh one. Thus during the course of ages practically all the forests of the low country have had their growth periodically interrupted. The Chena lands are not sufficiently extensive to be shown on the vegetation map. They are dotted about in the low country jungles.

The grass-lands of Ceylon are comparatively limited and confined to more or less specialised areas. There are two distinctive types :

(1) Patana, grass-land without trees.
(2) Talawa, grass-land dotted with trees.

The **patanas** are mainly in the hill country and some of them obviously represent the first growth on recent clearings. The comparatively recent abandonment of the coffee plantations gave rise to a large number of patches of open grass-land ; a number of these are to be found in the neighbourhood of Kandy. Certain areas, notably in the Uva basin are possibly permanent grass-land ; there are, in addition, the Elk and Horton plains lying between Diyatalawa and Nuwara Eliya. On the vegetation map most of the Uva basin is marked as being under tea ; much of the patana has been cleared for this purpose, but there still remains a considerable area of typical patana. The whole of the basin is above 3000 feet and consists of a depression surrounded by a wall of hills. Reference has already been made to the lower rainfall which occurs in this depression ; it is on the average considerably under seventy-five inches. During the period when the rain from the south-western monsoon is most concentrated on to the south-west edge of the hill country it suffers considerably from drought ; the relative humidity of the atmosphere is also lower here than in any other part of Ceylon. It is therefore probable that the subsoil is often so much dried as to prevent successful tree growth. It is evident, however, from the success of the tea plantations that this type of land is not entirely unsuitable for certain types of trees. The remarkable appearance of the Uva basin has already been referred to in the chapter on Relief. The short smooth grass gives to the surface of the hills a velvet-like appearance. Magnificent views of the Uva patanas can be obtained from many points near Bandarawela, or from the surrounding hills. Up to the present the patanas have not been greatly used ; the grass, though rather coarse, might form feeding grounds for cattle, but as Ceylon is not a favourable region for cattle breeding, there is no extensive development of this industry. The plains near Diyatalawa have long been utilised for military camps because of their dry surface, comparative coolness and freedom from dangerous animal pests.

The **talawa** country is also mainly in Uva Province, but further east in a considerably lower area. The biggest portion lies amongst the low isolated hills and ridges near the upper reaches of the Gal Oya, to the east and south-east of Bibile. Talawa is the same as what is usually described in geography books as " Savana " ; the latter is the African term for grass-land dotted with trees ; some English geographers have used the term " park-land," on account of its similarity in appearance to the cultivated parks of Britain. Students from Ceylon who visit England will doubtless be struck with this similarity. It is not easy to explain exactly why this particular type of country exists in Uva. It is

common in India on the Dekkan Plateau, but is rare in Ceylon. Most of the areas of Savana land in the world are in regions of summer rain with a long period of drought—roughly of six months' rain and six months' drought, accompanied all the time by great heat. There is no part of Ceylon that usually has as much as six months' continuous drought; the rainfall statistics show

FIG. 66.

Talawa or Savana Land near Bibile. A fire swept over this area just after this photograph was taken, which burnt all the grass and leaves of the trees.

that some rain occurs practically everywhere every month. We must remember, however, that much of this rain is ineffective and is so rapidly evaporated that for many months the condition is practically equivalent to drought. Trees seldom grow in a region where the subsoil is not permanently moist; there is, however, a highly specialised group of trees which can grow on very little moisture, and, what is even more important, can survive an annual fire. One of the most important characteristics of Savana country is the fire which usually occurs some time during the dry season, and rapidly destroys nearly all

the vegetation. As the plants gradually become drier the heat of the sun at mid-day or some other cause may set up combustion, and in the slightest wind the fire will spread with the greatest rapidity. None of the Talawa trees are of known economic value, and therefore there are not many names in common use ; the only ones at all familiar to the average reader are the various species of rhododendron and acacia, and the patana oak. The grass of Talawa is usually long and coarse, very different from the average patana grass ; it usually reaches about three or four feet in height. The best known species are mahna and illuk. Cultivated mahna grass yields the well known citronelle oil, which is used medicinally and as a protection against mosquitoes. The Talawas are mainly along the inner side of hills and ridges facing away from the coast and looking towards the outer barrier of the hill country. It is probable that these slopes receive somewhat less rainfall than the coastward facing slopes, which receive an additional supply during the north-east monsoon. It is possible therefore that the inner slopes do not receive sufficient rainfall to keep their sub-soil thoroughly moist throughout the year, and that during the period when the rainfall is most concentrated on the south-western wall of the hill country the surface becomes extremely heated and is therefore peculiarly liable to fire. The conditions existing in this particularly interesting region require, however, further study. This explanation is a mere suggestion, and must not be taken as in any way final. There are comparatively few rainfall stations in this region, and without the definite figures it is impossible to proceed much further than this. It must always be remembered that both patana and talawa may be due to the result of comparatively recent ill-considered deforestation.

Lands which have no markedly cold season have usually **no definite rest** period in their plant life. In the colder lands of the north leaves are frequently shed annually previous to the resting season, and the formation of new leaves is always associated with the revival of activity during the warmer season. In Ceylon there is no definite resting period for the whole of the plant life, and also no definite period for the formation of new leaves. Though flowering and fruiting are more common from April to June, each plant seems to carry on its own cycle of activity in its own time ; and individual plants of the same species, may be flowering, fruiting, or putting forth new leaves at different times. The rubber tree sheds all its leaves annually, most being dropped between January and March ; the new leaves rapidly appear, however, and on the same plantation there can often be seen trees with fully developed, half developed and fallen leaves at the same time. A large number of evergreen trees shed their

leaves gradually and the new shoots are formed throughout the year. Thus the whole island tends to maintain an even greenness except in those parts where the plants are dried during the drought season. Similarly, there is no definite flowering season for large groups of plants, and one seldom meets with a landscape covered with masses of bloom of one species, as so frequently happens in temperate latitudes. There is nothing in Ceylon which corresponds to the purple, heather-covered landscape of Norway or Scotland during the latter half of August. The best show of flowers on a large scale is possibly that of the red flamboyant and pink and yellow acacias. A foreigner is usually more struck by the luxuriant green foliage than by the abundance of flowers.

Swamp and water plants do not form any separate vegetation region ; they may be found more or less all over the island. Owing to the impermeable nature of the underlying rocks and the high rainfall there are a considerable number of streams and pools ; areas with running water have usually a different group of plants from those in which the water is almost or completely stagnant. Hollows containing patches of a very impermeable clay often contain bogs which exhibit a very interesting series of plants. Many of these are to be found in the island ; an easily accessible one is in the neighbourhood of Moonstone Quarries, near Mitiyagoda, south-east of Ambalangoda. In these bogs are found a large number of remarkable insectivorous plants, which in the absence of nitrogeneous food in the soil supplement their diet in this direction by extracting it from the bodies of insects which they catch by various mechanical devices. The most striking of these is the Pitcher Plant, Nepenthes, which the student should certainly investigate ; there are, however, a number of smaller plants, amongst which may be mentioned a very tiny variety of sun-dew. The mechanism of these plants can be found described in any ordinary text-book of botany.

The swampy regions near the sea-coast, many of which can be found near the mouths of the larger rivers, or round the lagoons, usually contain mangrove trees in their wettest portions. The mangrove swamp has a vegetation almost as peculiar as the bogs which have just been described. The various species of mangrove adapt themselves to their muddy bed and to changes of water level by developing either roots which grow out of the stems and drop vertically into the mud, or respiratory roots. These roots are often twisted and snakelike in appearance, and give to the mangrove swamp a weird effect, especially when viewed in the half light ; an occasional crocodile, lifting its grinning

visage from the water, seems strangely appropriate in this setting. In the water is a tangled mass of plants which are similarly adapted to changes in the water level, though many of them remain completely submerged. Some of the most typical mangrove swamps lie on the eastern coast between Pottuvil and Trincomalee. The pandanus, a common tree on sandy shores, also develops buttress roots above ground, like some mangroves.

The shallower water-courses of Ceylon present an abundance of characteristic plant forms. In the hill country their extent is somewhat limited by the narrowness of the river valleys, but in the low country the rivers widen out and wander about, often overflowing their banks and forming large shallow lagoons near the coast. There are associated with these lowland rivers wide tracts of swampy land containing an infinite variety of water plants ; the chief characteristic of these plants is their very abundant leaf growth, some of the leaves attaining an enormous size. They include many species of rushes and water-lilies.

Of all the water-plants of Ceylon the lotus lily is perhaps the most beautiful and characteristic. The lotus pond is usually mentioned by travellers as affording one of the most attractive scenes in the island. Pleasing light effects are produced by the radiant sun or the brilliant tropical moon ; and indeed the lotus pond by moonlight is considered by many admirers of the beauties of nature to be one of the loveliest sights in the world. The lotus plant, with its beautiful circular leaves and stately reddish flowers standing out of the water, has appropriately been chosen by the peoples of India as the symbol of infinity.

PART II. CHAPTER 11

ANIMALS

EVER since the dawn of history the island of Ceylon has been known to the rest of the world as a paradise of wild game. In the remote past it must have been practically covered with forest, and the chief inhabitants of the island were elephants, monkeys, leopards, buffaloes, various kinds of deer, wild hogs, crocodiles and snakes. With the increasing dominance of man, the wild beasts have gradually decreased in number, until many common forms have become rare, or even extinct. The animals, like the vegetation, are similar to those of South India, only a few forms, such as a species of sambhur, called the Ceylon elk, and the snake called polonga, being peculiar to Ceylon ; while certain animals like the tiger, hyena, fox and wolf, which are common in parts of India, are quite absent from the island. To the birds and insects the same rule applies. In all the tropical forests of the hot, wet regions near the equator the number of species of birds, reptiles, amphibians and insects is remarkable.

The climate is particularly favourable for the breeding of insects. It is continually warm and they are able to breed all the year, and many insects lay their eggs in moist places or in water. The actual number, apart from the number of species, is probably something like a hundred times the ordinary number in the temperate zone. Especially numerous in Ceylon are the ants, beetles, bugs, and butterflies ; the latter present species of the most extraordinary size and beauty. The swarms of ants of every size and colour which can be found in every part of the island are the most useful scavengers, for they eat the dead bodies of other insects and small animals, and in the neighbourhood of houses, all the food which is left about. In the wilder parts of the island there are various species which make enormous ant-hills, some as much as fifteen or twenty feet high, and forming a conspicuous feature of the landscape. The white ants which bore into wood are a great nuisance and a formidable destructive agent in buildings. There are, luckily, certain woods, such as teak and ebony, which they avoid ; otherwise they greatly operate

against the maintenance of any permanent structures in the way of building or furniture. This is no doubt the reason why so very little ancient woodwork has ever been preserved. In the temperate zone it is possible to find in preserved remains wooden objects of almost every period, dating back to two thousand or more years ; in Ceylon there are very few preserved remains in wood which are more than about a century old. The leeches of the wet forests, certain of which are peculiar to Ceylon, are vastly more numerous than in the temperate zone, where they are usually only found actually in water.

Insects play such a tremendous part in Ceylon in the spread of disease, in man and domesticated animals and also in the destruction of crops that the Government employs special officers, called Entomologists, to study them. Mosquitoes of the genus Anopheles carry the malaria parasite, which they transmit from one human being to another. Dengue is carried by another mosquito. A special officer called the Government Malariologist is employed to study and suggest means of preventing the increase of these mosquitoes. A certain flea on the rat carries the germs of plague ; this has now been almost exterminated in Ceylon, owing to the steps taken by Government to prevent the movement of people during epidemics and to assist in the destruction of rats. House-flies carry parangi by crawling on the open sores of infected people. Indeed, they carry many forms of disease, especially infantile diarrhœa, by crawling about in the dirt and then walking on food or perhaps on helpless babies ; they will pollute milk, which is a good breeding ground for typhoid germs, if they have first been crawling on sewage ; they buzz around meat which is unprotected, and pollute it to such an extent as to render it unfit to eat. In the temperate zone this only occurs in the summer, for during the winter the flies disappear, either to die or hibernate. Thus there are increased dangers from insects in hot countries.

Quite a number of the birds are migrants from the temperate zone which come south during the northern winter. The best book on the birds of Ceylon is by W. E. Wait, M.A., F.Z.S. Probably about 120 species come to Ceylon during the northern winter. They stay more in the north of the island and do not as a rule nest there. Some birds from India, such as the peregrine falcon, nest in Ceylon. The same type of bird from Siberia only remains for a short time. The island is evidently at the limit of southern migration. The dry parts of the island have more ground birds, while in the wetter portions they are found mainly in trees and bushes. There are, on the whole, fewer singing birds, and a greater number of those which make raucous noises than

in the temperate zone. A large number, such as the cuckoo, owl, hawk, eagle, and wild duck, only represent species of families which are common in the temperate zone ; the crow is one such bird which is especially abundant in Ceylon. The latter bird is very numerous in the hot countries of Asia and Africa, and though such a great thief, it is really, like the ant, a most useful creature, because it is a scavenger and prevents the accumulation of putrefying food and other rubbish in the neighbourhood of houses. One of the most remarkable birds in Ceylon is the "Seven Sisters" Bird, which has the exceptional characteristic of always going about in sevens ; whenever one of these birds is to be seen, six more can always be found in the immediate neighbourhood, the whole seven being apparently a sort of social group who remain in communication with one another. This is very rare in birds all over the world. They often, like crows, go about in large flocks, but it is very unusual to find them in organised groups like this, of a constant number. Some of the smaller birds of Ceylon, such as the humming bird, are remarkable for the exquisite colour of their plumage, while amongst the larger birds, the peacock, which is indigenous, ranks as one of the finest birds in the world ; peacocks have greatly decreased in numbers in recent years.

Amongst the **reptiles** the large number that live in trees calls for comment. There are the many beautiful tree lizards which are coloured to match the bark or foliage, as well as the chameleon, a curious lizard-like creature which changes colour according to its surroundings. The friendly and familiar little house lizard is characteristic of Ceylon. Snakes and crocodiles are steadily decreasing in numbers, as so many have been slaughtered during the last fifty years. Amongst the snakes the polonga has the most deadly bite ; it has a remarkably powerful head which is much broader in proportion to the body than that of most species of snakes ; the body is usually about five to eight feet long while the head is often nearly a foot in diameter.

The squirrel, which lives so happily in the roofs of houses, differs greatly from the squirrel of European countries ; the latter is quite timid and rarely approaches human beings, while the Ceylon squirrel is exceedingly tame. They are smaller than the European variety and have broad flat tails instead of bushy ones, whilst their grey colour renders them distinctive. Monkeys, of which there are five species, are still very numerous, though they have forsaken the immediate proximity of the larger towns. Though they often live very near to human dwellings, they are rarely friendly like the squirrels. Bats are numerous ; the largest species of bat is called the "flying fox," and lives in trees.

The wild animals of the jungle have enormously decreased in numbers during the last fifty years. They have latterly so much decreased as to render it necessary for the Government to make arrangements for their protection. An elaborate series of regulations has been made, relating to shooting; only dangerous creatures, such as crocodiles, poisonous snakes, leopards, or rogue elephants can be shot at any time. The other animals can only be hunted at certain seasons of the year outside of their breeding period. The wild elephant, which has always been regarded as so characteristic of Ceylon, is fast disappearing. Very strict regulations have been made to ensure the adequate protection of this animal, because it is so valuable for forestry work and does not breed very satisfactorily in captivity. No other animal in the world can pull up trees or perform the same feats of strength as the elephant. The Sabaragamuwa forests have the best elephants as a rule, though they do not necessarily remain in the same part of the island all the year, as they are prone to wander great distances. The chief kraals for catching elephants are held every few years in Sabaragamuwa Province.

Reference has already been made to the fact that Ceylon is not a good place for breeding **domestic animals.** Even the domestic fowl has remained very near to the wild type, and lays an egg only about half the size of the average fowl's egg in Europe, which has been greatly improved in size by artificial selection and breeding. Eggs are, of course, in many households not much used, on account of the large number of people who are vegetarians. Buddhists of extreme views often refrain from eating eggs. The egg therefore does not form such an important article of diet as it does in some countries. In Colombo, however, and in the various European centres there is a large demand for eggs, and a number of the country people, especially in the Jaffna Peninsula, make a good deal of money by exporting them to these places.

All kinds of animals, except the elephant and water buffalo which really belong to Ceylon, are difficult to rear, partly for climatic reasons, but also on account of the ravages of certain diseases, such as Rinderpest, through which large numbers are annually lost. The government is now taking steps to prevent the spread of these diseases, as it is hoped that this will have a beneficial effect upon the quality of the animals. Action is now being taken to improve the breed of cattle, which are the most important animals. The European cow has been so much improved by breeding and special feeding that it has been made to produce milk for the greater part of the year, the quantity only dwindling during the winter months. In Ceylon the cow only

produces milk while it is suckling a calf, and the quantity is much smaller. The Ceylon cow is also smaller in size, and is distinct from the European species in having a hump on its back. The use of bulls as draught animals is usual in practically all hot wet countries; they are not such convenient animals as horses, because they go so much more slowly and cannot carry such great burdens; but the horse cannot live healthily in a hot wet climate. Europeans imported horses into Ceylon in the early days of their occupation, because they

FIG. 67.
Water Buffalo on Paddy Fields.

were the most speedy means of getting about, but it was very expensive to maintain them and they were never a great success. With the advent of bicycles and motor-cars this animal has been fast disappearing, and is now becoming quite a rare sight. The number of cattle usually in the island in recent years has been between $1\frac{1}{4}$ and $1\frac{1}{2}$ million. A number are imported from India for improving the breed, and for meat, every year. The feeding of animals, especially cattle, is a great problem in Ceylon, because it is deficient in small and tender pasture grasses. There is an abundance of coarse grasses like Mahna and Illuk, which are of little use as food, but the small grasses, which cover such wide areas in the temperate zone, are almost unknown. Were it not for the thrifty people

who make good use of every available source of food, it would be impossible to keep so many cattle. Buffaloes, which only amount to about a third of the number of cattle, are next in importance. The buffaloes used for milk are usually imported from India. The water buffalo is easy to maintain in all the wet parts of the island, but as it cannot remain healthy unless it stands in water for a number of hours every day, it is very difficult to keep in those areas which have a number of months of drought. The decay of paddy cultivation over wide areas during the modern period has led to a certain carelessness about the breeding of these animals, which are of such immense value for ploughing paddy fields and treading out grain. Goats, which number about a third of the buffaloes, are the most convenient animals for keeping in the dry zone, especially as they will feed on leaves other than grass, *e.g.* those of the jak tree. The sheep, like the horse, belongs to drier lands and does not thrive in such a moist country as Ceylon. A limited number are kept up country, but a great deal of mutton is imported from India or, as frozen meat, from Australia. The use of meat as food is comparatively small amongst the Ceylonese. A proportionately greater amount is used by the European population.

As in India, the chief use of cattle is for draught purposes, while in Europe this latter is almost insignificant as compared with their use for meat ; similarly, the demand for both milk and butter is much less than in Europe. Butter is used much more in India for making ghee, but in Ceylon this substance is replaced by coconut oil. Tinned butter is imported a great deal (for the use of the European population), from Australia.

PART III

ECONOMIC GEOGRAPHY

PART III. CHAPTER 1

CULTIVATED CROPS

THE cultivated crops of Ceylon may be divided into two groups :

(1) The ordinary food crops, together with those commodities that the self-supporting farmer produces for his own needs.

(2) Cash crops, *i.e.* those which are grown with the object of raising money to pay for the extra things which a cultivator cannot provide for himself.

In the olden days, before the advent of rapid means of transport, the majority of people were self-supporting and had little use for money. Provided that a man had simple wants, it was a comparatively easy matter in Ceylon to feed, clothe and house his family by means of the produce of his own piece of land ; it was even possible for many people to grow more than they actually needed. A few people near the coast would specialise in supplying the demands of traders. These people would need money for their foreign trade, though a great deal of it would be carried on by bartering goods. Even the traders, however, would often have estates upon which they grew their own rice ; those who had a surplus of any of the ordinary products would, as a rule, quite gladly give it away. This condition obtains at the present day in many of the villages. The agricultural villager requires little from the outside world and though he as a rule has plenty to eat, he often possesses very little money. Money becomes more necessary in communities where people specialise in one form of work, and especially industrial countries where a large section of the community is not concerned with producing food from the land. One man may, for example, spend his working hours in making one particular little screw which fits into a certain place in a certain machine ; he may himself have no use whatever for this particular screw. He depends on the rest of the community to build his house, make his clothes, and supply him with the whole

of his food. In Ceylon, very few people live in this way, the greater proportion of the population producing, at any rate, a certain minimum of food on their own land. As there was a surplus in the past, the community could afford to maintain a large proportion of the population as priests, teachers, or doctors, relieving them from the anxiety of providing for their own physical needs. Instead of giving money for these purposes as would be done in an industrial country, the people built their houses and provided them with food and clothing. Thus it was and still is possible to maintain the large order of priests, who possess no money, and are daily given their food by the villagers. On the other hand money is a necessity to the priests in industrial countries. The Ceylonese farmer developed the instinct to make sure, at any rate, of his own food by growing the chief necessities himself; even the old cinnamon growers, who could make so much money by the sale of their crops, would nearly always have a certain amount of paddy land. This custom survives at the present day. People who receive a salary in money are seldom as poor as their low salary would denote in an industrial country, because they so often have means of growing a certain amount of their own food. Europeans are chiefly responsible for the introduction of the practice of growing cash crops almost exclusively. It became common during the early part of last century, and during the last hundred years the land exclusively devoted to cash crops has steadily increased. The Ceylonese were always somewhat reluctant to give up entirely the production of the essential food crops, though latterly large fortunes have been made on the cash crops.

The chief food crops of Ceylon are rice, coconut (or palmyra in the north), plantains, jak and breadfruit, various underground tubers like the yam and manioc, chillies, onions, peas and beans, and a variety of fruit and vegetables; maize and millet are grown to a certain extent, mainly on the east side of the island.

Next to the plantain the papaw, mango, lime, and orange are the most important fruits. The kitul palm was formerly the chief source of sugar (jaggery) apart from honey. Its importance has decreased, owing to the importation of cheap cane sugar.

Rice, or paddy, is one of the oldest cultivated crops in the world; it belongs almost exclusively to Asia, and has only been introduced into a few limited areas in the other continents. No one knows at what date its cultivation commenced. There are a very large number of varieties, which may be roughly classed into two groups, known as hill paddy (or dry paddy), and wet paddy.

The hill paddy (called Elvi) is a variety which can be grown with only a small supply of water. It is usually cultivated in hilly districts where an abundant rainfall can be relied upon ; it will grow on poorer soil and requires less attention. It is indeed often sown broadcast on land which has been cleared and burnt, only the larger weeds being removed during the period of growth. The yield is comparatively high in a favourable season. Hill paddy may also be grown in low lands unsuited for irrigation, as, for example, in the drier portion of the Southern Province. Here it may only be regarded as a makeshift where the wet variety is impossible, and the results are often poor. Only a small amount of hill paddy is grown in Ceylon, the wet paddy being the ordinary crop.

Wet paddy, as its name implies, must always be grown on lands which can be kept under water for a long period. It is therefore usually confined to the alluvial valley floors, or the flood plains of the rivers. It may, however, be grown almost anywhere in hot countries where the soil is good and suitable irrigation works can be constructed. Its cultivation requires a great deal of skill and experience, and paddy cultivators are amongst the most highly-skilled agriculturists in the world. The irrigation works connected with it also require a large amount of organisation and co-operation amongst the cultivators, which no doubt contributed a great deal towards the development of civilisation in the rice countries. The number of crops in Ceylon varies in different areas. Three crops are normally rare ; only occasionally near large tanks is this possible in good rainfall years. Even two crops are not by any means the rule, especially on the same soil, though the region below Giant's Tank, much of the Kandy Plateau, and certain non-flooded parts of the South-West Lowlands have two crops regularly. One remarkable feature of all the rice countries of Asia is that a comparatively small amount of artificial fertiliser is imported, in spite of the fact that continuous cultivation is practised in many parts and that no other crop can be grown on paddy land. Through centuries of experience the self-supporting peasant farmer of Asia has learnt to utilise to the full all his available local resources.[1] Rice cultivation in Ceylon is said at present to be lower in standard than that of certain of the other countries. This may, however, be due to the set-back produced by several centuries of disturbed conditions, and especially by the forced removal from the tank country, which necessitated the opening up of new land in other

[1] India is behind China in this respect. There is much waste of natural manures in India and possibly also in Ceylon.

parts of the island. Some improvement, however, has latterly been made. Considerably more manure has been imported in recent years. The usual method of improving the soil is to plough in the weeds which accumulate between reaping and sowing, and also the old straw. Leaves and twigs are buried at the second ploughing, and sometimes a special crop of a leguminous plant, which adds nitrogenous material to the soil, is grown for ploughing in ; the latter is generally referred to as a " green manure crop." In the districts that are well served by roads and railways artificial fertilisers, such as bone dust and fish guano, which add phosphates to the soil, are often employed. The productivity of the rice lands is truly remarkable when we consider how long some of them have been cultivated. In China, which contains the oldest paddy lands, there are some which have been cultivated for periods exceeding three thousand years, where the people have never imported any considerable amount of artificial fertiliser. We may contrast this with the state of affairs on the prairie lands of America, where in the course of some twenty or thirty years the wheat lands have become so exhausted that the farmers are now having to spend thousands of pounds each year on imported fertilisers.[1] Though machinery and wholesale methods have been the means of making a few people rich with great rapidity in America, it is quite evident that hand labour and personal attention are more economical over long periods of time. Many people have talked of introducing machines for rice cultivation in Ceylon. It must be remembered, however, that many of these labour-saving devices are somewhat wasteful and not necessarily suited to densely populated regions with small farms ; they suit the needs of extensive farming on thinly populated lands. This does not mean to say that the methods practised in Ceylon are not open to improvement ; it is quite possible that with the spread of education many new developments may occur.

There are two main paddy seasons in Ceylon. The Maha crop (called Monmari in Tamil) is sown from the end of August to the middle of October, according to the district, and is reaped in February or March. The Yala crop (called Pinmari in Tamil) is sown in March or April and reaped between July and September. Sometimes sowings are made between these two crops, which are called Mada crops.

There are a great many varieties of paddy, which are classified mainly according to the time they take to mature. Some take at least six months, such

[1] It must be remembered, however, that in America they have always been aiming at a *more than proportionate yield*.

as Mavi, Hatiel, and Suduvi ; others take as little as three months, or even less, such as Danahala, Murungan, and Balavi. Then there are a large number of other types between those two which mature in about four or five months. The varieties are chosen according to the possibilities of different districts. Some suit a particular soil, while if the farmer wishes to take off more than two crops he must naturally choose those which mature in a shorter period. Almost every district has its own particular varieties. The area under wet land paddy is about 900,000 acres, and the yield averages roughly seventeen million bushels per annum. The methods of cultivation differ considerably in different parts of the island, one of the most important differences being in the method of sowing. The seeds are generally soaked and allowed to sprout before they are sown, but in some places the germinating seeds are sown broadcast on to the flooded field, while in other cases they are allowed to grow from four to six weeks in specially prepared nurseries, after which they are transplanted at definite intervals in rows across the fields. The last method usually produces the best results, though it takes more labour ; but it is only possible when the water supply is reliable. Under the first method the seedlings are thinned out about six weeks after sowing, at the same time as the weeding is done ; more weeds accumulate by this method. Transplanting is mainly done in the Central Province and in the Kegalla and Jaffna districts. There is also some difference in the preparation of the land, ploughing being adopted in many cases, while in other cases buffaloes are employed to trample the muddy soil until the desired consistency is attained. Still another difference, which seems to be largely a matter of individual taste, though it may be based on reasons which are now obscure, is in the various patterns which are made in the irrigation channels on the terraces, many of which exhibit remarkable and distinctive designs.

The paddy terraces of Ceylon reach a high level of perfection, not only in the hill country, where they are so beautifully fitted into the narrow valley floors, but also on the flat lowlands where the slope is so slight that it requires a great amount of skill to prevent the water from stagnating. Even when once they are made, the terraces require a great deal of attention and highly-skilled labour ; there are always such difficulties to contend with as land crabs boring holes which drain the terraces, or the constant removal of soil by the running water. Hand watering has to be employed on the Jaffna limestone, because there are practically no streams on the surface ; but elsewhere in the chief paddy lands water is always kept running over the terraces until they are drained for the ripening. The irrigation is accom-

FIG. 68.

The black marks show all the areas under paddy. Compare this map with Fig. 61.

[Map compiled by A. Ginigé, M.A.]

plished by the diverting of streams in the area with over seventy-five inches of rain (see Fig. 43). In the lower flood plains of the rivers, which are the most extensive rice lands of the present day, channels are run away from the river over the alluvial soil to the edge of the flood plain. In the area having less than seventy-five inches annual rainfall, storage reservoirs are the rule; the paddy land is usually situated just below the outlet of the tanks (see Fig. 96) and small channels are run over the terraces. There are twelve tanks in Ceylon with an area of over 2000 acres each, and a large number of big ones which approach this figure, as well as about 4600 small village tanks. The total of storage reservoirs, including very small ones, approximates 12,000. At the present time a large proportion of them have some small amount of paddy land attached and every effort is being made to put them to their full use. The Government is pursuing a progressive policy of active development. The foundations are being laid for much more extensive expansion of future irrigation policy. A sum of Rs. 15 million has been provided for irrigation works, and already schemes of an aggregate estimated cost of about half this sum are approaching the construction stage. The Department is actively engaged in the following schemes, which when completed will enable 50,000 acres to be brought under cultivation: Minipe Left Bank scheme, Kagama Extension, Parakrama Samudra scheme, Elahera, Minneriya, Kanda Ela Reservoir, Bathmedilla, Gin Ganga, Bolgoda and Colombo South. The restoration of the Iranaimadu Tank was designed to ease the pressure of population in the Jaffna Peninsula. The largest areas under paddy are shown in Fig. 61; there is, however, hardly any part of the island where it is not grown, as we see by Fig. 68.

The **coconut** ranks next in importance to rice as a food crop, but it has also become a cash crop, so that the island produces far more than it needs on the 900,000 acres which are planted with coconut.[1] Only a part of this area is cultivated on systematic lines so as to obtain the maximum production, a great many trees being grown by people in their own gardens and receiving very little attention. Ceylon is, however, the chief exporter of coconut produce in the Empire. It is, as a rule, a profitable crop, provided that the soil is suitable; this is mainly due to the fact that it requires much less labour than any of the other important crops. One labourer can work about four or five acres,

[1] Coconut products realised nearly 80 million rupees in 1928—over 30 millions on copra and nearly 20 millions each on oil and desiccated coconut. In 1945 and 1946 the figure stood at 70 million rupees.

whereas for tea the average number of labourers is one to the acre, and for rubber, three. People who are not growing coconut for export very often pay practically no attention to the trees, and only engage a man to come round and pick them when necessary. The coconut tree is generally found near the sea, and thrives in a sandy soil. It is seldom grown in high places, the nuts being smaller at a high elevation. They can be grown quite well up to about 1500 feet, and can be grown quite a considerable way inland in Ceylon, even as far as the Matale district. The best results are usually obtained near the coast. The palmyra palm replaces the coconut in certain parts of the north and east, and is especially associated with the Jaffna Peninsula ; but in recent times, owing to the improved prospects of the trade in coconut products, a large area has been put under coconuts on the east of the Peninsula. The ideal rainfall for coconuts is from fifty to ninety inches, well distributed through the year, but they can be grown outside these limits, and, as in the case of Jaffna, on a badly distributed rainfall.

In the coastal districts of the western and southern provinces the palms have been mainly used to tap for toddy to supply the arrack distilleries ; the spread of prohibition through local option will doubtless considerably affect this industry. The toddy can only be drawn on a Government licence. There are now eight large modern distilleries situated in the Kalutara district, the output capacity of each being not less than 60,000 gallons per annum. The coconut is chiefly grown as a cash crop, mainly for copra and coconut oil. Many people do not care to trouble with the extraction of the oil, but send their nuts to Colombo, Chilaw, and a few other places, to be treated in the factories, where hydraulic presses are used. Others prefer to use the ancient Chekku, a large wooden pestle and mortar, revolved by bullocks, which has been employed for many centuries in Ceylon. A great deal of copra is, however, exported without extracting the oil ; the best copra, having the highest oil content, is dried in the sun, but in wet weather artificial drying by means of a grill over a fire of coconut shells, has to be used. The demand for copra in the industrial countries of the temperate zone has become enormous during the present century. This is due to the fact that the population in these countries has increased enormously since the industrial revolution, and the raising of animals upon which they depended for fat has decreased in relation to the number of people ; and as in the countries concerned there are very few plants which yield fat, they have been obliged to tap the resources of the tropics, which abound in oil-yielding plants. The chief use of the oil obtained from

copra is for making margarine, which is eaten with bread as a substitute for butter, or for cooking purposes ; it is also used in the manufacture of certain soaps, hair oils, and other products. Great Britain is the chief purchaser of coconut oil and copra, while Holland and Denmark take a good deal from Ceylon. The material left after the oil is extracted is used for making cattle

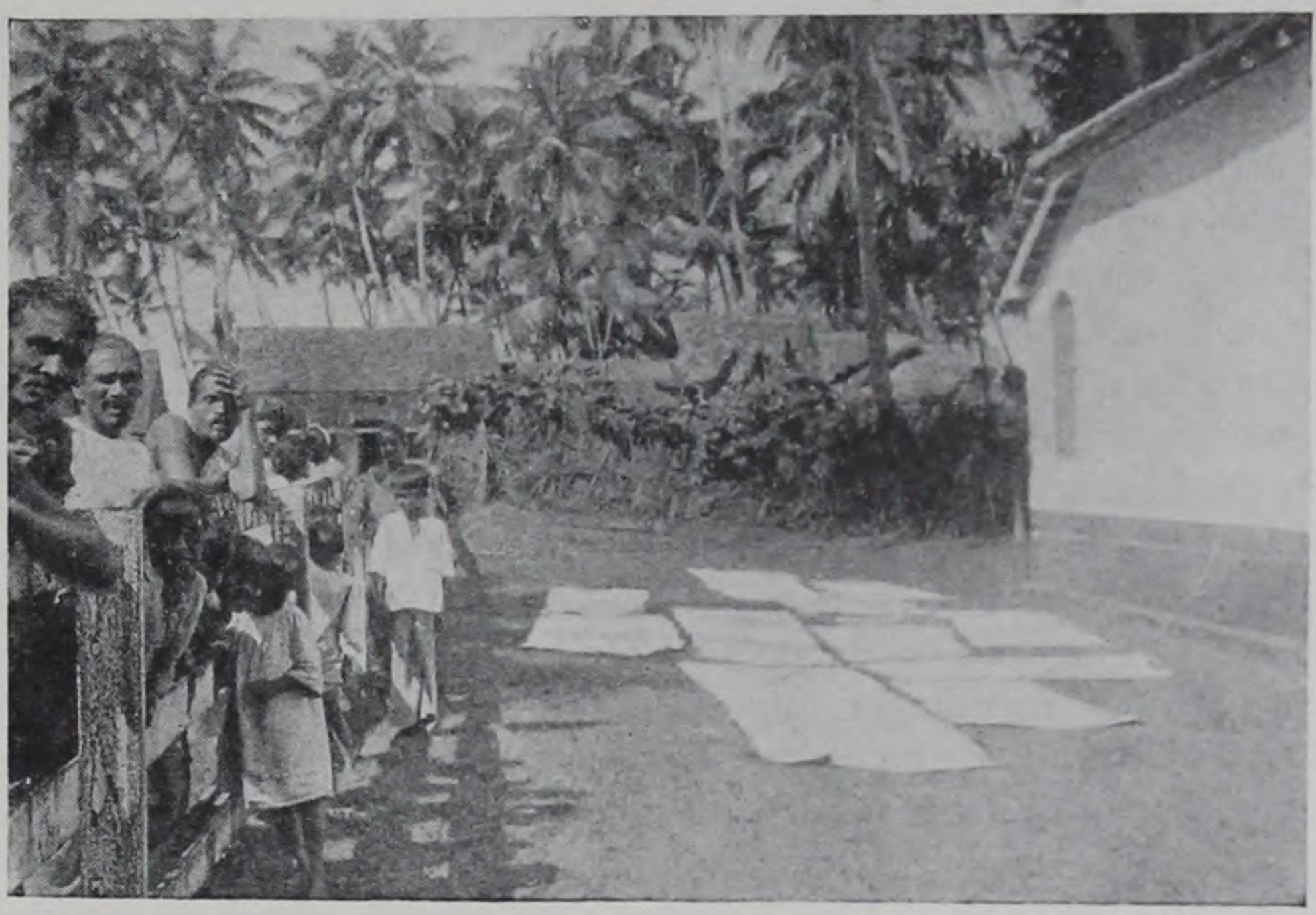

FIG. 69.

Coconut being dried for oil extraction on a small scale by a villager at Hikkaduwa. The grated nut is placed on sheets and put out in the sun.

cake, called poonac in Ceylon, or as manure. The export of this product is now becoming important. In addition to copra, fresh coconuts are also exported in enormous quantities ; these are bought extensively by the countries of Western Europe, and Egypt is a very important buyer.

Desiccated coconut is another product for which there is a great demand in certain countries. It is made by grating up the white part of the kernel and drying it, either in the sun or by means of a drying machine. Many estates have a small mill attached, fitted with machinery for the purpose of preparing the dried coconut ; a number of Sinhalese growers, however, prepare it by

hand and dry it in the sun in small quantities. Great Britain and the United States are the chief buyers of this product ; it is used for making various kinds of cakes and sweets.

Jaggery and vinegar are important products of the coconut which are confined to home use and never exported. Previous to the growth of modern trade cane sugar was but little used in Ceylon, and jaggery took its place. The latter is an unrefined form of sugar, from which a product similar to refined cane sugar could be obtained. At one time some effort was made to establish an industry for the refinement of jaggery, but it met with no success because there are so many other things in Ceylon which have become more profitable. When the coconut flower has been cut off, the juice which can be collected can be dealt with in three ways. If it is just allowed to run into the pot and left undisturbed, a certain microscopic organism called a yeast, which is present either in the air or in the juice itself, settles in the liquid and attacks the sugar, splitting it up into alcohol and a gas called carbon dioxide, the bubbles of which can be seen in the liquid, which is then called toddy. If a little lime is placed in the pot, it prevents the action of the yeast, so that the sugar is unchanged ; this is called sweet toddy. (The trees are licensed by the Government for this tapping, which can also be done on the palmyra and the kitul palms. The licences for palmyra are few in number, but the kitul licences are not far behind the number for coconuts.) Jaggery or hakuru is obtained by boiling sweet toddy for a long time until the sugar crystallises out. A third way of dealing with the liquid is to leave it exposed to the air to form toddy, and then put it into large sealed vessels ; after being kept for some time (usually about six months), the liquid changes into vinegar.

The utilisation of the husk of the coconut also gives rise to a considerable industry, which is less organised than the trade in oil and copra. Much of the work is done in the villages, a good deal of it by women, who use their spare time at home in making such things as mats and ropes. The husk is soaked in water until the soft part decays, after which it is taken out and beaten to free the fibre. A number of mills which do this work by machinery have been established in the Colombo and in the Negombo districts. The fibre is made into brushes, yarn, rope and mats, and is also used for stuffing mattresses. A large proportion of these products is used in Ceylon, though there is a considerable export, in some years exceeding Rs. 3,000,000 in value. The chief foreign purchasers in pre-war years were Great Britain, Japan and Germany.

The uses of the different parts of the coconut tree are innumerable. The nutshell forms many household articles; the wood is used a great deal, and the large leaves, of which each tree drops about twelve per year, when woven into cadjans (see Fig. 91), are invaluable for thatching purposes. The sweet liquid inside the young fruit, or "kurumba," is extensively used as a drink; the so-called "king coconut" which has hardly any kernel is grown exclusively for drinking purposes. One use of the coconut, however, which is very common amongst the Ceylonese, is not much employed outside the Indian area; this is the production of so-called "coconut milk" for cooking purposes, by grating up the fresh nut and soaking it in water. It is not generally known in the temperate zone that this fresh coconut "milk" is quite as important a food as the kernel in the countries where the coconut tree is grown.

The palmyra produces very small nuts which are not so convenient as the larger coconuts; most of the products of the coconut used in village life are paralleled by similar products in the palmyra.

Of the various kinds of fruits and vegetables which are grown for home consumption very few besides the plantain have been much improved by cultivation. There are abundant varieties of these commodities, owing to the fact that a number belonging to temperate countries, *e.g.* the potato, have been introduced. The plantain, which is called in the Western Hemisphere the "banana," is seldom cultivated on a large scale, as there is no call for its export; a great number of varieties exist in Ceylon, which can broadly be divided into three groups: the tasteless ones, which are cooked as a vegetable; the sweet ones, eaten raw; and those which are mainly cultivated for their leaves to use as a substitute for plates. The only plantations of any size are between Rambukkana and Polgahawela. The jak generally excites the wonder of strangers on account of its enormous fruits coming out of the lower part of the trunk. This extremely useful tree, whose fruits form a staple human food, whose leaves form an important food for goats, and whose wood is the most used for household furniture, is almost unknown in the temperate zone; its distribution is confined to South Asia. The chillie, which is such an important article of food, is well known nearly all over the world because it is used for putting into pickles. The mango is also fairly well known outside Ceylon, on account of the frequent allusions to it in literature, and also because it is so much used for chutney, and is tinned for export in India. The yam, a typical "poor man's food" because of its easy and continuous cultivation, is also very common.

The areca nut palm is another very characteristic crop which is not grown as a rule in plantations, though there are a few in the Kegalla district. There are so many odd trees dotted about the island that it is very difficult to estimate the acreage which they cover; it is probably about one-twelfth the area covered by rice. Several varieties are grown, and the tree will thrive with but little attention in most of the damper districts below 2500 feet. The use of the nut for chewing with betel is very ancient, and its origin is obscure. In recent years there has been a tendency to replace some of the trees with coconuts, because the latter are more lucrative as their products can be sold to the European countries. A similar thing is taking place in South India, which is the chief buyer of the areca nuts exported from Ceylon. The value of the exports often exceeds Rs.3,000,000. The diminution in the Indian supplies is likely to lead to higher prices for the Ceylon product. The cultivation of the betel creeper always, of course, accompanies that of the areca palm. This plant is also so much grown in gardens and small holdings that it is impossible to estimate its acreage; it is always grown with other things, as it climbs round the trunks of palms. Vast quantities of the leaves are available, but there is, naturally, no export, as the leaves will not keep.

The chief cash crops of Ceylon are tea and rubber. The following list gives some idea of the relative areas under the chief crops:

Crop.	Acreage in 1946.
Coconuts	920,253
Rice	910,000
Rubber	605,260
Tea	549,886
Areca Nut	69,000
Palmyra	50,000
Citronella	30,107
Cacao	19,700
Cinnamon	33,077
Tobacco	2,656
Cardamoms	6,000
Chenas, Vegetable and other crops	140,000

Of these, only the first four cover considerable areas continuously. The larger areas under these crops are shown in the Vegetation Map (Fig. 61).

Though the area under tea and rubber is less than that under coconuts and rice, their value as cash crops is very much greater, on account of the high

prices which they fetch abroad ; similarly cinnamon has always been a very profitable crop, although the area it covers is comparatively small. Tea is in value easily the first of the cash crops. Reference has already been made to the fact that it is a comparatively new introduction, due to the failure of coffee. It has spread with remarkable rapidity, and made more money for the island than any other single crop. As, however, so many of the tea plantations are in the hands of Europeans, who do not settle permanently in the island, but only hope to make enough money to retire to their native land, much of the profit from this industry goes outside of Ceylon.

The tea plant is a variety of camellia, whose home is in China, and was only introduced just before the failure of coffee in 1883. The Chinese had cultivated and exported tea for a long period previous to this date, and Ceylon had been connected with the tea trade with Europe. The plant has been introduced with great success into India, and its prosperity there no doubt suggested its introduction into Ceylon. As the climates are somewhat different the plant has naturally become slightly modified in the countries where it has been introduced ; but the chief difference between what the rest of the world knows as "Indian" or "Ceylon" tea and "China" tea is mainly due to the different method of preparing it in China. The plant usually grows best on well-drained hill slopes, and will flourish on an exceedingly high rainfall, though its success in the Badulla district has shown that it will grow on a comparatively low rainfall and even where there is quite a long period of drought. There is a natural tendency on the part of plants to reduce their leaf surface under drought conditions and to produce a more plentiful leaf crop where the rainfall is abundant and well distributed. For this reason it has always been supposed that tea, being a leaf crop, must have an abundant rainfall. The experiments in Ceylon, however, tend to show that the plant is more adaptable than was formerly supposed. Convectional showers which are liable to occur throughout the year, even in the dry Uva Basin, are probably a great help ; the young tender shoots which are plucked for use, push forth somewhat rapidly when a good shower follows a dry spell. Most of the plantations are above 3000 feet ; it can be grown lower, but seems to produce the best results at a high elevation. It has therefore been the means of bringing vast areas of waste land or forest under cultivation. About 80 per cent. of the tea estates are in the Kandy, Nuwara Eliya, and Badulla Districts (see Fig. 61). The plant would normally grow into a large bush some twenty feet high, but is cut down at intervals varying from eighteen months to four years, so as to

ensure a good supply of fresh young shoots ; it is not therefore allowed to grow more than three feet high except for seeding. The plucking can be done throughout the year, but April and May are usually the busiest months for the pluckers. The yield varies greatly with soil, variety, elevation, cultivation, manuring, etc. Reference has already been made to the problem of the preservation of the soil on tea plantations. At first they were completely cleared of plants, but it has been found that even with the best possible drainage arrangements a great deal of the soil is removed by rain ; and in addition to

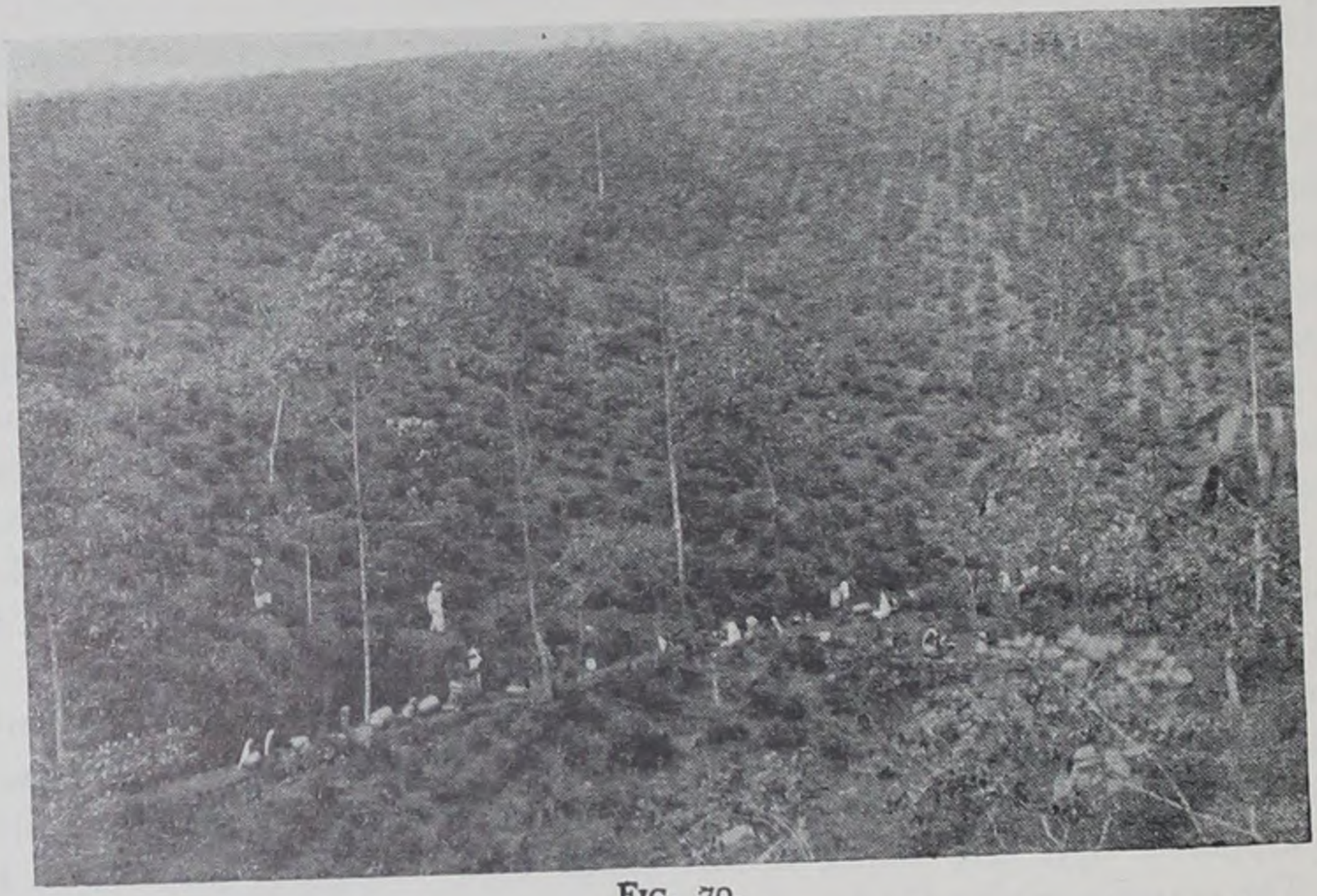

FIG. 70.

Tea Estate near Nuwara Eliya. Note the large shade trees—chiefly grevillias.

this it lacks vegetable humus, which is so important for plant growth. The tendency now is to fill up the spaces between the tea plants, in the first place by planting trees, whose longer roots will help to retain the soil, and in the second place by growing green manure plants, which can be dug into the soil at intervals. Quick-growing leguminous plants are the most useful for this purpose, because they add nitrogenous material to the soil. A number of plants have been tried, and vigna is the one most commonly in use. Sometimes the leaves of the interplanted trees are cut off and dug into the ground. The dadap tree is used for this purpose in the lower plantations, while at the

higher elevations a form of acacia is greatly used, and in drier districts the grevillia and tephrosia.

The amount of manufactured tea produced varies from about 300 lbs. to 1200 lbs. per acre per annum. The boxes for packing are made in Japan, and are imported to the number of about 2½ million annually. The following description of the manufacturing process is taken from Turner's *Handbook of Ceylon*, 1922:

"On being removed to the factory, the 'leaf' is spread out to wither in special withering lofts for eighteen to twenty-four hours, and it is then passed through rolling machines for several specified periods. After this time the 'roll' is dropped out, and appears as lumps of twisted green leaves hanging together in masses. These masses are then broken up by the 'roll-breaker' and the coarse leaf separated by a sifter, rolling and sifting being carried on alternately, say, for about two hours. The leaf is then spread on glass or wooden tables, or mats, with free access of cool air, to ferment or oxidise. In about two hours it assumes a copper colour and develops a peculiar aroma. At a certain point, determined by experience, the fermentation is arrested by placing the leaf in the firing or drying machines. These provide a hot air draught to convert the damp fermented leaf into the familiar dry and brittle black tea. This black tea is sifted into grades, of which samples are sent to Colombo for tasting by the brokers' and agents' experts and the assessing of the value. The grades are bulked separately, packed in lead-lined tea chests of about 100 lb. each, soldered up, labelled with the name of the estate, and despatched to Colombo for shipment. The grades of tea usually prepared in Ceylon are Broken Orange Pekoe, Broken Pekoe, Orange Pekoe, Pekoe, Pekoe Souchong, Dust, and Fannings.

"Green tea is prepared by steaming the green leaf instead of withering as above described, and by omitting the fermenting process. It is graded as Young Hyson, Hyson 1 and 2, Gunpowder, and Dust. Green tea is drunk in Russia and America with lemon juice and sugar."

About 280,000,000 pounds of black tea were produced in 1946, while green tea has almost disappeared from the market.

The chief buyer of Ceylon tea is Britain, which takes about 70 per cent. of the exports.

The acreage under **rubber** is just a little more than that under tea, both crops covering more than half the area under either rice or coconuts. Though the acreage of rubber is slightly greater the value of the export is usually about

half that of tea.[1] The price of rubber was for a long time artificially inflated by a control of its export, and a great many people made fortunes from it during this period. The restriction was removed in 1928.

The material which forms rubber is very common in the trees of hot wet climates, and can be obtained from many creepers as well as trees. They are especially abundant in the Congo and Amazon forests. When Europeans first began to take an interest in rubber they made experiments to compare the yield of various plants, and selected a tree found in the Amazon Basin and now called the "Para" Rubber Tree, as being the most suitable for cultivation. This plant has proved to be remarkably adaptable, and has now been introduced into all the countries where rubber is cultivated, such as Africa, India, and Malaya. It was introduced into Ceylon through the influence of the Government of India, in 1876, and a plantation was made in the Botanic Gardens at Gampaha (Heneratgoda). The original plantation is still in existence, and consists of a number of remarkable trees, which have attained a large size, and one in particular has given most extraordinary yields. The seeds of these trees have supplied a large proportion of the plantations of South Asia. The rubber tree generally grows at a lower elevation than tea, usually below 2000 feet. It needs a well distributed rainfall, and only grows in the moist parts of the island, with over eighty inches. The most important plantations are in the Kegalla and Kalutara districts, which produce nearly half the supply. Improvement in the methods of cultivation and tapping has resulted in a great increase in output in recent years. The improvements have been mainly in the direction of making smaller cuts in the trunk and of tapping at longer intervals, such as every two or three days instead of daily, bud-grafting to increase the yield per acre, etc. The trees were formerly exhausted by too heavy tapping, and it was found that they remained more healthy and yielded for longer periods when the tapping was done more slowly; so that whereas formerly a large number of cuts were made, in the form of a herring-bone, at present only a single cut is made, extending less than half-way round the tree. The tapping does not commence until the tree is about six or seven years old. The trees are generally rested for about a month during February or March, when most of the trees shed their leaves. Heavy rain interferes with the collection of the latex, and as the chief rubber estates are situated in the region most affected by the south-west monsoon, the best yield is usually obtained

[1] In 1946 about 227 million lbs. of rubber were exported, realising about 229 million rupees, while about 290 million lbs. of tea realised about 379 million rupees.

during the north-east monsoon season ; about 60 per cent. of the yield is usually obtained during the latter half of the year. Estates are now extending into the drier region on the south and south-east of the hill country.

The rubber is manufactured from the latex or juice of the tree, in two chief ways, according to the purpose for which it is required. Most estates have their own factories, in which the work is done by complicated machinery. The first process in either case is to strain the latex, dilute it with water, and to pour this liquid into vats, where it is mixed with acetic acid (the acid contained in vinegar). The addition of this acid makes the liquid thicken up, or " coagulate." For smoked sheet rubber the coagulation is done with less acetic acid, and takes place more slowly. The latex is poured into vats of required size for sheets, mixed with the acetic acid and allowed to coagulate in the vats. It is then kneaded, rolled to extract the water, and put through a machine which makes it into sheets marked with a diamond pattern so as to accelerate drying and prevent sticking together. These sheets are then hung up in a room where they are smoked and dried for a period of seven to fourteen days, when the finished product is ready for export. " Crêpe " rubber is coagulated more quickly, and after being drained of the water it is put through a machine which makes it into lace-like filaments. These are treated in a hot-air drier, and then rolled together into what is called blanket crêpe. Sheets of crêpe can be prepared and made ready for export in twenty-four hours, if the weather is not too damp, so that it can be got rid of more quickly than the smoked sheets. The smoking is not absolutely necessary, but was possibly performed originally when the rubber was prepared in a more primitive fashion, in order to prevent the formation of mould on the impurities in it during a lengthy transport by slow-moving vessels. Now that the transport is so rapid, and cleaner methods are employed in the up-to-date estate factories, it is apparently unnecessary, and the production of crêpe rubber is greatly increasing. There are, however, a large number of buyers in the various manufacturing countries who think that the smoked rubber gives better results.

The term " rubber " does not represent the original name of this substance. When first introduced into Europe from the Amazon Basin, it had a name which might be rendered in English as " Kah-uchu," which the French explorer La Condamine, who discovered it in use among the Amazon Indians, transliterated into French as " Caoutchouc." The name " rubber " was first given to it by an English chemist, about the year 1770, because he found that it would rub out the marks made by graphite, the substance used for lead

pencils. This word has passed into a great many languages. Rubber is one of the most useful substances in the world, and during the last hundred years more and more uses have been found for it. The plantation rubber is not the same as the material sold in shops. In the factories of Europe and America it is put through a number of processes, the chief of which involves the addition of sulphur in varying proportions, which is called vulcanisation. This makes it completely elastic and waterproof. When further treated with sulphur and put through some other processes, it can be made into a hard black substance called " ebonite," or " vulcanite," which is used for making fountain pens and many other objects, such as brushes and combs, camera fittings, etc. In addition to such obvious uses of rubber for motor and cycle tyres, mackintoshes and pencil erasers, it has a number of other exceedingly important uses, depending on the fact that it is a bad conductor of both heat and electricity. It is therefore most useful in the manufacture of all sorts of electrical plant and equipment, particularly for covering wire intended for transmitting electrical current. In surgery, too, it is extremely useful because it is so easily cleaned and sterilised. The increase in the use of rubber during the last thirty years can be imagined from the fact that Ceylon exported in 1909 about $1\frac{3}{4}$ million lbs. whereas in recent years the export has usually been between 175 and 225 million lbs. Great Britain and the United States are the chief buyers, the United States having specialised in the production of rubber goods, particularly for the motor industry.

In the cash crops, there is a great gap between tea, rubber and coconut, and everything else. The other crops all cover a much smaller acreage, and are financially less profitable. The tendency has therefore been to take up these three crops at the expense of everything else. Citronella, cinnamon and cocoa are the three most valuable of the crops covering smaller areas.[1]

The plant which yields **citronella oil** is a cultivated form of mahna grass, which is one of the natural grasses of Ceylon. The plant will grow in any ordinary soil below about 2000 feet, and does best in a hot and moist atmosphere. The chief areas under cultivation are in the south-west lowlands near the coast, especially in the Matara district. The cultivation is comparatively easy, and the plants only require to be kept free from weeds ; they are ready for the first cutting in about eight months. Two cuttings are usually obtained during the year. The annual yield of oil is usually about 40 lbs. per acre. The oil is obtained by heating the leaves ; it comes off in the form of gas, which

[1] In 1946 cinnamon products realised over 10 million rupees, cocoa nearly 3 million rupees, and citronella nearly 9 million rupees.

is condensed on cooling. It is used in other countries for soaps and perfumes, but is better known in Ceylon as a preventive against the bites of mosquitoes and leeches. The chief buyer of citronella oil is the United States, which takes about half the amount, while Britain takes about half of the rest. The export usually amounts to about $1\frac{1}{2}$ million lbs., the production having been fairly steady for many years.

Cinnamon is one of the most ancient exports. The Asiatic trade with Europe in spices is one of the oldest trades in the world, and when Ceylon and the East Indies first became known to the West European nations they were referred to as the "Spice Islands," a name which continued to be used until modern times; and even at the present day the idea that these islands produce practically nothing else but spices is very prevalent in the popular mind in Western Europe. It may well be wondered by an inhabitant of any of these islands why such a common substance as cinnamon or pepper should be so much sought after by the people of ancient days. The traders used to brave all sorts of dangers and undertook long journeys to bring back small quantities of these precious substances, which sold at very high prices. It was indeed a most lucrative trade. The people of Europe have always had to store food for the winter, and in the Middle Ages their methods of preserving it were very primitive. Now storage methods have so greatly improved that it is a very easy matter to keep food in good condition, but in early days people often had to eat comparatively tasteless, or even unpalatable food, which had been kept for a long time. Spices were greatly used for concealing the disagreeable taste of such food, and to help in its preservation, so that they were very highly valued. At the present day cinnamon is still used for flavouring a great many dishes, but the oil which is distilled from it is even more in demand for medical purposes. The area under cultivation has decreased very considerably; in the early days of European rule each successive nation had plantations which were constructed and controlled by the Government and were an important means of revenue. A great number were in and near Colombo, and stretched up as far as Negombo. It was not so long ago that the part of Colombo called "Cinnamon Gardens" was in fact a large cinnamon plantation. The plant grows best in the moist lowlands, and is now practically confined to the coastal lands between Galle and Negombo. Normally the tree grows to a height of between twenty and thirty feet, but for the production of the spice it is cut down annually. After being cut it produces a lot of long, straight shoots, from which the bark will easily peel after the flowers and fruits have developed. The fruits ripen in

April, and the peeling of the bark is usually done between May and October. The peeling is a work of special skill and has to be done by specially-trained men, who rub it with a round stick and take off the whole of the bark of a shoot of about four feet in length in two long strips. These strips are allowed to "ferment," after which the outside skin is removed, and then the bark is left to finish fermenting and to dry. The so-called "quills" are then fitted one into the other and made into rods, which are tied up in bundles ready for export.

FIG. 71.
Retort for distilling Cinnamon Oil on an Estate near Hikkaduwa.

The oil is distilled from the chips and trimmings in Ceylon, but in the countries of destination it is also distilled from the bark that has been exported. The United States are the chief buyers of cinnamon, next to which come Great Britain, France and Belgium.

The cacao plant was first introduced into Ceylon by the Dutch. In English it is known as "cocoa," through the perpetuation of an error in an early advertisement. The tree grows most successfully between 500 and 2000 feet, and while not needing a particularly high rainfall (about sixty inches to eighty inches), it flourishes best in a somewhat stuffy moist atmosphere, and is therefore well suited to some of the shut-in mountain valleys of the hill country. At

present the most important areas under cultivation are in the Kandy and Matale districts, expecially the Dumbara Valley. The young plants are generally grown from seed, and have to be carefully shaded. Even when the tree is mature, it does not like too much sun, and other trees are planted between the cacaos at a sufficient distance apart so as to give just sufficient sunlight and air to the cacao trees, while creating a good deal of shade; the dadap tree has been found to be most suitable for this purpose. The pods containing the cocoa beans, which are borne on the trunk of the tree, are usually gathered about the fifth year. The plant continues to produce flowers and seeds all the year. A small crop is picked in May, June and July; but the chief crop is in November, December and January. The soil is generally kept clear of weeds, and as the plant is not grown on exposed hill slopes the question of protection of the soil from rain wash is not so serious as on the tea and rubber plantations. When the pods have been picked they are cut open and the contents, consisting of a large number of seeds, usually called "cocoa beans," together with an amount of soft pulp, are placed under sheds in boxes, for fermentation. During this process the pulp becomes liquid and flows away through holes in the bottom of the box. After twelve hours the beans are lightly washed, and turned over into another box; at the end of thirty-six hours they are again washed, and taken to the curing house. They are much better cured in the sun, on coir matting, which takes about five to seven days, but as much of the picking is done during the wet season, most of the estates have a curing house where the beans are treated artificially; they are spread out on coir matting on the floor, and the building is heated to between 110° and 120° F. by means of hot air which is conveyed through pipes. After this process the product is ready to be sorted and sent away.

The best Ceylon cocoa is the highest grade of this product in the world, and is in demand for expensive confectionery, though not all that is grown is of this high quality. The chief buyers of Ceylon cocoa are Great Britain and the United States, a large proportion of the purchases of the latter country going to the Philippines. The beans are mainly used for the manufacture of cocoa powder for drinking purposes, and chocolate. The cocoa bean contains a great deal of fat, most of which is removed for the preparation of cocoa powder for drinking; for the latter purpose the powder has to be treated with some substance that will make it more easily soluble in water. The fat which is removed is of great value; some of it is used in the manufacture of chocolate, but a good deal is in demand for the making of ointment and tooth

paste. The outer husks which are removed from the bean can be used for cattle food. For the making of chocolate the fat is retained, and sugar and other substances are added. As Ceylon is a cocoa producer, and so well situated for trade, it may be asked why such a simple manufacture as that of cocoa and chocolate could not be carried on in the island. Various attempts have been made, amongst which may be mentioned the Peradeniya Chocolate Works. They have, however, been totally unable to compete with the big manufacturers of the industrial countries. The chocolate trade of the world is practically a monopoly in the hands of a few very large firms in Europe and America, who have stifled smaller companies, either by under-selling in the market or by buying up their businesses with the enormous sums of money at their command. Hence it seems unlikely that the manufacture of cocoa products will ever attain to any great importance in Ceylon unless the Government decide to protect the industry.

The area under **tobacco** is comparatively small, but it is a very important cash crop in certain districts, more especially in the Jaffna Peninsula, where its cultivation for the Indian market has long been the most important business of the people. The North-Central and Central Provinces also grow a little, that produced in the Dumbara Valley, near Kandy, having become well known on account of its high quality; it is particularly good for wrapping cigars. A certain amount is also grown near Trincomalee and Batticaloa.

There are a great many varieties of tobacco; the plant grows fairly well in any country which is free from frost, and the variations depend mainly upon the amount of rainfall, as it is a leaf crop. Some types which have smaller leaves and very deep roots, are adapted to drier regions; while those which belong to the wetter soils have much larger leaves and shorter roots. Many experiments have been made in Ceylon, especially in the Experimental Gardens at Jaffna, to find the types of tobacco which are best suited to dry regions, as it is one of the crops which might be extended into those parts of the so-called "dry zone" which are now covered with jungle. Tobacco cultivation in the Jaffna Peninsula is carried on with great skill. The soil being somewhat poor, and exceedingly dry for the greater part of the year, the seeds are sown early in the wet season in special nurseries, from which the seedlings are chosen for planting in the fields. The greater part of the growth takes place during the rainsof the north-east monsoon, and after December, as a rule, artificial watering is necessary. This involves an immense amount of labour, as the watering is mainly done by hand in the early morning and late afternoon, the water being

obtained from wells. When the plants reach the height of about four feet, they are cut down and allowed to lie in the sun for a day, after which the leaves are separated, each with a piece of stem left attached, and then taken to a shed for withering and fermenting. After fermentation, the tobacco is smoked over a slow-burning fire of coconut husks and palmyra nuts. It is then made up into the well-known Jaffna Cheroot, which is in great demand all over Ceylon itself as well as South India. The tobacco which is used for chewing with betel is harvested by cutting off the leaves, commencing from the top of the plant, and only the best leaves are selected for this purpose. The plant is more vigorous and coarse in growth than the smoking type, and it suits certain areas, which therefore specialise in it. The people of Jaffna depend mainly upon the sale of their chewing and smoking tobaccos in South India. At one time the Travancore markets were closed to Jaffna tobaccos, and this produced a great deal of distress, because this particular type of tobacco is not popular amongst Western people, who were the only other likely buyers. The Government therefore decided to initiate experiments to find out whether the type of tobacco which is most liked in Europe could be grown in the Jaffna Peninsula. They discovered a variety which was capable of development, but as the Travancore markets quickly re-opened, there has been no further need to continue its cultivation. Unmanufactured tobacco leaf is sold in India and the Straits Settlements, and cigars are also sent to the Maldive Islands ; thus the trade is limited almost entirely to the countries of South Asia. The soil in the Jaffna Peninsula is so carefully manured that a crop can be obtained each year, food crops being planted in the latter part of the year after the tobacco crop has been gathered. In the Central Province, where the methods of cultivation are quite different, and another type of tobacco is produced, it is seldom grown on the same land in two consecutive years ; after one crop of tobacco and one other crop the land is often left to lie fallow for several years before it is again planted with tobacco. The cultivation is mainly in the hands of Tamils, and unlike tea and rubber it is on relatively small holdings.

The **cardamom** is the only other spice besides cinnamon which is grown in any quantity in Ceylon, the acreage being about a quarter of that under cinnamon. It is a small herbaceous plant that grows to a height of three or four feet under the shade of trees. It is usually grown in high places (2800 to 4000 feet) having a rainfall of 115 to 150 inches a year. Two varieties of the plant are cultivated, one of which is unsuitable on account of its flowers being too near the ground. The Mysore variety, whose flowers are further up the plant, is

more satisfactory and has a stronger growth. The little pods are generally collected by women and children, the trade being mainly in the hands of small owners. Some of it is dried in the sun and exported as green cardamom ; the rest, which is sold as "bleached cardamom," is bleached, soaked and dried in sulphur fumes, until it is quite white, and the ends of the fruits are picked off. Some of the seeds are exported in the pods, while a few are taken out of the pods and ground to a powder. The areas under cultivation are all in the wetter portions of the hill country, but there is no one area which specialises in cardamoms. It is generally grown along with other crops in small quantities.

Quite a number of other commodities are grown in a small way by individual farmers, for sale. Amongst these, may be mentioned chillies and peas which are dried for preservation. The peas sold as "gram" in the streets and shops, are generally grown in Ceylon. One product which could be more developed is kapok or "silk cotton" which grows on a tall tree and could be easily produced in small numbers as a garden tree by the poor cultivator. The pods of this tree contain a quantity of soft silky "down" which is now being used for domestic purposes in many countries to replace the down of birds.

PART III. CHAPTER 2

DEVELOPMENT OF THE FORESTS

The economic value of the forests of Ceylon is comparatively small, in spite of the fact that they cover over half of the area. This is largely due to the neglect of afforestation which was a natural result of the disorganisation due to invasions and changing governments. The Sinhalese kings are said to have paid a good deal of attention to the forests, maintaining reserves and planting timber. As each new European Government assumed control its officials were confronted with the formidable difficulty of dealing with a completely new series of plants, entirely different from those to which they had been accustomed in Europe. It took them in each case a considerable time to study this new flora, and this was naturally deferred until they had got the country well under control and could bring out experts to carry on the work. Their interests were mainly focused upon the commodities which were useful for trading purposes, especially cinnamon ; and as the Ceylon forests had never furnished much timber for export, they received but little attention until a comparatively late period. Any knowledge of forestry which the Ceylonese formerly possessed was probably lost during this long period of political unrest. The inhabitants of the island used certain trees for timber and firewood the cutting of which was not controlled during the periods of political unrest. Then there has also been in Ceylon an amount of shifting about of the cultivation, partly due to the chena system and partly to the movement of population caused by the invasions. There is consequently very little virgin forest, containing old trees that are well developed and numerous enough to be placed on the market. There has recently been a great demand in America for veneer made of flowered satinwood ; yet it is difficult to find sufficient trees big enough to sell for this purpose. The British Government had for a long time been anxious to improve the forests so as to make them of value in trade, yet even in quite recent administrative reports it is stated that the forests are not yet sufficiently well known for the Government to take much action to

improve them. Men of long experience, with a good knowledge of the trees found in Ceylon, and of their possible uses, must be found before any steps can be taken to improve the forests. For a long time the trees of known value

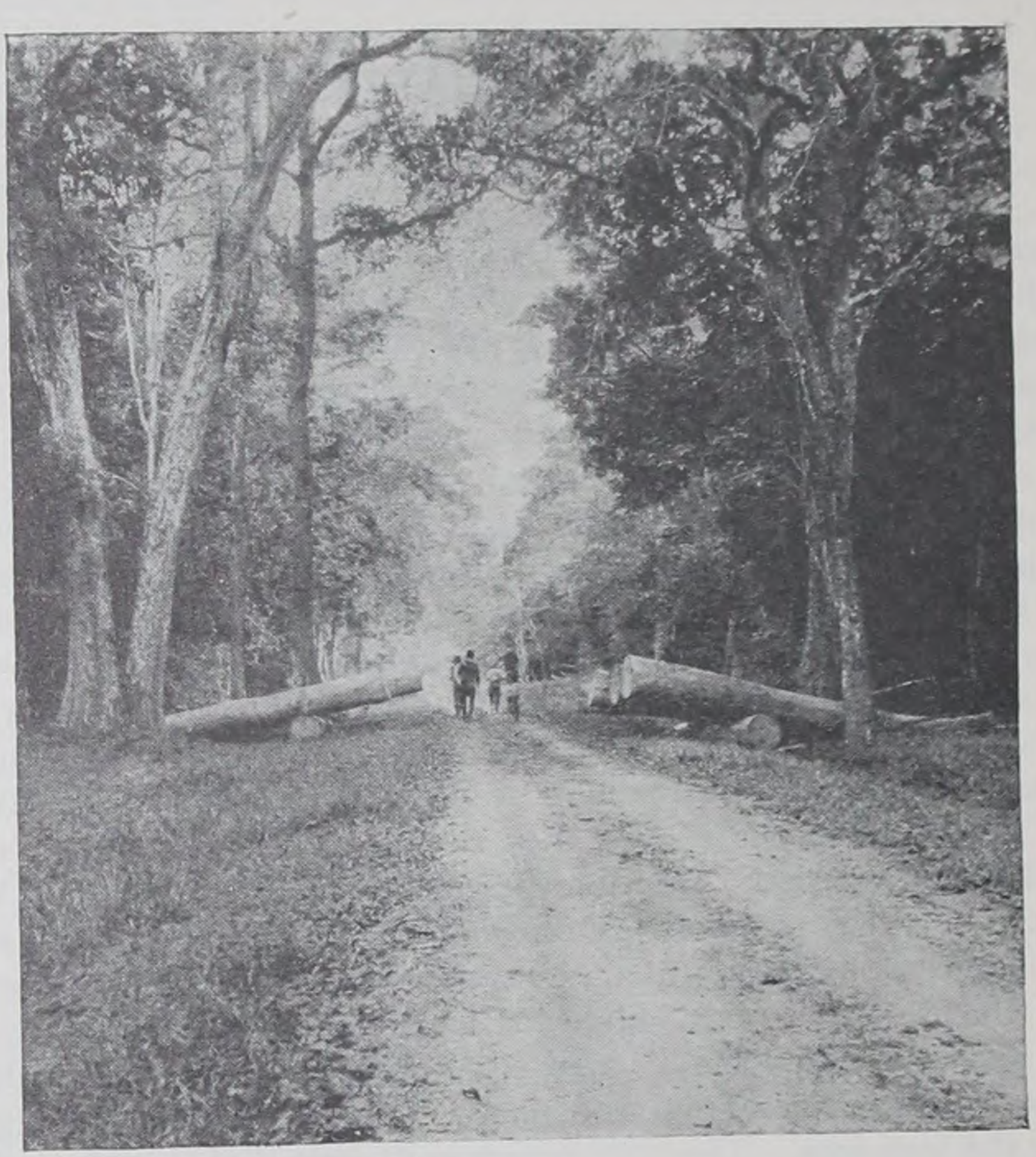

FIG. 72.

Satinwood ready for Transport on the road to Pottuvil. It is dragged through the forest by elephants. Ebony trees also occur in this district.

have been taken from the most accessible places, without any regard to re-planting.

When the railways were first built, wood was used as fuel on the locomotives,

owing to the absence of coal in the island. In recent years, however, it has been found possible to obtain coal from abroad at a reasonable cost and this has naturally been substituted for wood owing to its superior heating power per unit volume. The Government had a number of timber plantations in the hill country for the supply of wood fuel for the trains ; now that it is no longer required they have considered the possibility of using these plantations for the development of new kinds of timber which have been found valuable in other countries, and which might possibly be introduced into Ceylon. The Lawson's Cypress, a fine timber tree which does well in the warmer parts of North America, has been suggested ; it is a type of tree somewhat similar to the Douglas Fir of Canada. The Government has also set aside a number of large forest reserves ; some of them are called game sanctuaries, but they are protected as much for the timber as for the wild animals. "The Government is pursuing a policy of making the island self-supporting in the matter of timber and forest produce. Organised Silvicultural Research conducted over the past ten years has yielded valuable information on a number of economic timber species, several problems of forest management, as well as a large amount of general silvicultural data of a fundamental nature. It has demonstrated the way to induce and bring up to establishment the natural regeneration of preferred timber species in the wet, evergreen, high forests of the wet and intermediate climatic zones of the island. It has helped to improve several lines of management practice, effecting very considerable savings in management and formation costs in different types of plantations." The jak is the principal timber tree of Ceylon, though its numbers have diminished in recent years. It is mainly confined to the moist lowlands, but the Government has begun the experiment of planting jak trees in disused chena lands, but it is too early as yet to assess their success. The latter work has occupied the attention of the Forestry Department for some time. A start has been made at reforestation, and teak forests are beginning to appear in the eastern part of the island. The chenas are usually first planted with a cover crop to prevent the growth of illuk, which later becomes a nuisance, and as this crop is developing the trees are planted. Nedun, palu, and teak, all of which are excellent timber trees, are also being used for this purpose. Palu is at present more abundant in the wilder parts of the island than any other timber. Milla, which is also found wild in the forests, is much in demand for railway sleepers. In the Kegalla district an experiment has been made in forming plantations of jak, alternating the trees with papaw. The lack of timber in the Jaffna

Peninsula gives rise to a vigorous trade in both firewood and building timbers with the Eastern Province. The chief plants used for the firewood trade are the tamarind, kon, chadavakku, tamana, and vitpani.

PART III. CHAPTER 3

MINERAL PRODUCTS

THE mineral products of Ceylon which have so far been discovered rank far below the vegetable products in importance and value. The **gem trade**, for which it is best known, is one of the most ancient trades in the world, dating back to the dawn of history, and it is quite probable that in ancient times the gems were much more numerous than they are to-day; it is remarkable, however, that after the removal of the stones for so many centuries there should still be any left. Reference has already been made to the situation of the chief workable deposits at the present time, and also to the mode of occurrence of the gem stones. The mining is mainly done by Sinhalese, who work in a comparatively small way on the co-partnership system. The trade is almost entirely in the hands of Moorish dealers, who get the stones cut and polished, and sell them in other parts of the world. Many of the best stones go to Europe and America, but a considerable number are also bought in Ceylon and India. There are no regular returns of this trade, and it varies considerably from year to year, as the finding of the stones is more or less accidental. The value of the annual output was estimated by Government officials in an average year as being somewhere near Rs.2,000,000. The most important stones are sapphires and rubies, the latter having attained to great fame at a very early date. The mining is almost entirely confined to the alluvial gravels in the Ratnapura District, but as the stones in these gravels must have originally worked out of the crystalline rocks there is some prospect that when the geology of the island has been more fully studied the working of the bedrock for gems may become common. At present, experiments have proved that the sapphire and beryl can be found in the rocks near Matara and Kandy. The necessary surveying for this kind of work is not at all easy, and liable to become very expensive because of the large amount of vegetation and soft surface deposits which veil the underlying rocks. These are in some cases so inaccessible as to make experimental borings very expensive. On the other hand

there are a number of places where bare rock projects from the surface. So long, however, as the vegetable products of the island continue to be so lucrative it is not likely that this more speculative kind of work will be at all seriously taken up. The mining is done on a small scale without any elaborate apparatus. The gem-bearing gravel is taken up and stored, and by degrees

FIG. 73.

Gem Mines at Pelmadulla, edge of hill country in background. The soft deposits dug out by the men are stacked in heaps and covered with palm leaves, etc., as in left foreground, to await the washing process.

washed in sieves. Though it is so often called gravel, it usually looks more like clay, and contains a large proportion of fine material which can easily be removed by washing. The larger particles, amongst which the gem stones are found, remain in the bottom of the sieve. The most difficult part of the work is to examine this material and pick out the stones which are likely to be valuable when cut ; they are rough and uninteresting in appearance, and no one would connect them with the beautiful flashing stones with their many reflecting surfaces which are produced by the cutters. Gem cutting is a highly

skilled form of work, and is only carried on at a few places in the world. A little is done in Ceylon, *e.g.* at Ratnapura, and at some of the ports of India ; in Europe the chief centres are Antwerp and Amsterdam, both of which are associated with the ancient gem trade with Eastern countries.

Apart from the ruby and sapphire, which have practically always fetched a high price in the market, the demand for the other stones varies very considerably according to the different fashions in vogue in other countries. There may, for instance, be a great demand temporarily for that curious jewel called the " cat's-eye," which is not found in many other parts of the world. The fashions in Asia are less variable ; the diamond and the ruby have always taken the first position in India, Burma, and Ceylon, but in Europe and North America, where in modern times, at any rate, jewels are not so much worn as they are in Ceylon, there will occasionally be a fashion for wearing coloured bead necklaces, which can be made from a large variety of different stones. Quartz is often very beautifully coloured, or clear like glass ; in the latter instance it is called " rock crystal " and can be cut to look something like a diamond. The amethyst is a purple kind of quartz, and the cairngorm a brownish yellow ; there is also a very beautiful pale yellow citrine quartz. The " Matara diamond " is a similar thing, but made of a different substance. The carbuncle is a form of garnet, and so is the cinnamon stone. The topaz is also found in Ceylon in many colours, and the demand for it varies greatly. Imitation stones are, however, now very largely manufactured in Europe, mainly from glass. This trade has competed strongly with the trade in natural stones during the twentieth century. The making of artificial pearls in Europe and America has similarly reacted upon the pearl trade.

The Ceylon **moonstone** is very well known, though it is not sold at a very high price. Periods also occur in which this jewel is fashionable in Europe and America. Mining for this stone is completely different. The method is to take out the felspar in bulk, and break it up to find portions that are suitable for cutting. Unlike many of the other stones, they are rounded instead of being cut into facets. The amount of money produced by this trade is, however, quite insignificant. There are now very few mines working, the chief being at Mitiyagoda near Ambalangoda.

Graphite, or plumbago, was for many years the most important of Ceylon minerals. The demand for it, especially in the steel industry, has been very great during the twentieth century. The output rose very rapidly, and some people made enormous fortunes from it, not so much by the amount of output

as by increasing the price, especially during the dislocation due to the Great War in Europe, 1914-18, when additional supplies were required for the making of munitions. In 1916 the graphite output of Ceylon was sold for 22 million rupees, and in the next year the amount was almost the same ; but towards the end of the War the French began to work vigorously upon some surface deposits in Madagascar, and were able to produce annually an amount of graphite exceeding that of Ceylon, and though slightly inferior in quality, it could be sold at a much lower price, because it was worked by exceptionally cheap labour. The consequence was that in 1918 the output was only half that of 1916, while the value went down to 4 million rupees. Since then it had steadily declined. In the prosperous years as many as 15,000 skilled labourers were engaged in this industry, and by 1924 the number had gone down to a few hundred. The manufacture of iron and steel goods is now being carried on by a number of nations other than Britain and America, who were the chief buyers from Ceylon ; so that the present problem is to find fresh markets, and to try to produce the mineral more cheaply by improving the methods of extraction. During the war years (1939-45) there was unprecedented activity in mining for this mineral. The peak was reached in 1942, when over 27,000 tons were exported, bringing a revenue of over 13 million rupees. Since then the demand has fallen, and in 1946 the exports amounted to just over 8000 tons, with a revenue of only $3\frac{1}{2}$ million rupees.

Considerable quantities of graphite were formerly obtained very near the surface, but a great deal of this has been removed, and in most cases the working is now carried on at a considerable depth ; the deepest mines go down to between 500 and 1500 feet. The veins of graphite suitable for mining are scattered about over a very wide area. Mines which either have been or are now worked occur in the following districts : Colombo, Kalutara, Kandy, Galle, Kurunegala, Ratnapura, and parts of Uva Province. The mining has always been mainly in the hands of Sinhalese, the mines being situated in the Sinhalese portion of the island ; some, however, are owned by English planters on tea estates. They are, as a rule, worked in a simple manner, almost entirely by hand, which makes the speed of the work comparatively slow ; this, however, is balanced by the small cost of outlay on working. Some of the larger mines have been fitted with electric light and machinery in order to increase the output.

No other minerals found in Ceylon take any part in the outside trade, except mica, which is produced in very small amounts and has been exported recently,

largely because of its use in apparatus for wireless telegraphy. The substance mined is a kind of yellow mica, called " amber mica," and is produced principally near Kandy.

Another substance of value discovered by the mineral survey is the rare mineral, thorium, which was found to exist in the island in the form of several compounds ; it is used in other countries in the manufacture of incandescent gas mantles. When coal gas is burnt for lighting purposes, it is rendered more luminous by introducing into the flame a construction woven from asbestos, soaked in thorium and other substances, and shaped to fit round the gas jet ; this " mantle " becomes incandescent (has a luminous glow) when the gas burns. This form of illumination has long been very common in certain countries of Europe and parts of North America, as well as in a few other parts of the world. It has now largely given way to electric light, so that the demand for these " gas mantles," as they are called, has diminished. The deposits have mainly been found in the sands round the coast, especially at Bentota. The exploitation has not been pursued with much energy, and it has brought little profit to the island.

Another substance which has possibilities, because it practically always occurs in crystalline rocks, is uranium, which is the chief radium ore. Radium is now in such great demand for medical and scientific purposes all over the world that the crystalline rocks of most countries are being explored to find the ore. Uranium has actually been found in Ceylon in small quantities, but as yet no extended survey has been made for it with a view to commercial exploitation.

The other mineral products of Ceylon are only of value within the island itself, and are practically never exported. Most of them have been mentioned in the chapters on Structure and Surface Deposits. There are the various pottery clays and brick earths, suitable for the making of bricks and tiles, which are found in practically all the river valleys. The most important brick and tile works, which have long been noted for a high standard of production, are in the Kandy and Colombo Districts. The process consists in cutting out the clay into shapes and baking it in kilns, after which the products are left out in the sun and air for a considerable period. These bricks and tiles find their way to many parts of the island to be used for the more expensive forms of buildings. Then there is the kabouk, which is made into bricks and used for most of the bigger house in the south-west portion of the island. Lime for mortar is found in the coral deposits round the coast, especially in great quantities

in the Jaffna Peninsula, while poorer quality lime can be obtained from the crystalline limestone of the hill country. The crystalline rocks everywhere supply road metal, and could also furnish an unlimited amount of very fine building stone ; the latter is only used to a very limited extent and stone is frequently imported from India for important buildings—*e.g.* the new Hindu Temple in Sea Street, Colombo, is nearly all made of Indian stone. The work of stone-dressing and carving is done almost exclusively by Indian workers possessing traditional skill, who are brought down from South India for this special purpose—*e.g.* the additions to the Tooth Temple, Kandy.

PART III. CHAPTER 4

SALT INDUSTRIES AND FISHERIES

CEYLON produces almost all the salt it requires; about one-sixth has to be imported and comes from the coast of Madras Presidency. The output, however, is now steadily increasing. Salt is a Government monopoly; that is to say, the Government claims the right to buy all the salt produced and to control its production and sale; the profits on the salt contribute to the revenue. Up to the year 1919 the production of salt was very variable, and the quality somewhat poor, a great deal of dirt being mixed with it. This was partly due to the fact that most of the salt holdings, called Vaikkals, were owned by wealthy people who took no personal interest in the manufacture of the salt, and often did not care whether it was worked or not, because they had income from other sources. They let the land out to labourers each year to use practically as they liked, and collected half the money which the Government paid to the labourers for the salt. The state of the salt trade about ten years ago was so unsatisfactory that the Government decided, in 1919, to supervise the storage of salt in private salterns and to construct some large salterns upon Crown lands which could be more effectively controlled, and where regular workers could be employed, so that a more even output could be assured. The Government officers considered that Ceylon should be able to produce all the salt it required. In 1945 the production of salt amounted to about 800,000 cwts., which is about the normal consumption. The greatest yield was at Puttalam. The Government salterns at Hambantota, Palavi, and Elephant Pass have been elaborated and improved, and the storage is much cleaner than at the private pans. They have discouraged the working of pans by people who would not keep their pans and stores clean, by refusing to buy the salt; these would obtain a much lower price by selling it privately. The biggest salterns are at Hambantota (see Fig. 74), and consist of a series of natural depressions called Lewayas, some of which are as much as 400 acres in area; many of these are not connected with

the sea, and the water absorbs the salt from the surrounding land. During the dry season the water evaporates and the salterns present a remarkable appearance, just as though they were covered with glistening white snow. Students who never hope to travel, and would like to have an idea of the appearance of a snow-covered landscape, (see Fig. 74), should visit the salt pans at the time that the collection is taking place. The work is mainly done by Moors and

FIG. 74.

Salterns at Hambantota during the Dry Season. Men gathering salt in background. The dark mounds are heaps of weeds and dirt.

Tamils. In 1927, 513,568 cwt. of salt was bought by the Government at a cost of rather more than a million rupees. The greatest yield was at Elephant Pass and Hambantota.

The sea fisheries of Ceylon have never been very extensive, though the waters abound in fish. The fisheries are mainly conducted by independent workers in the coastal villages, who confine their activity to the waters within about twenty miles of the coast. The haul is sold on the beach or in the village fish-market. Some goes direct to the villagers, but the greater part is sold by auction to contractors, who visit all the smaller places near the railway and buy up as

much fish as possible to send by train to Colombo, where it is re-distributed, to both inland and up-country centres. A number of places which are not touched by the railway are now assisted by motor traffic. Fresh fish is regularly taken in this way from Trincomalee to Anuradhapura and from Tangalla to Matara. Fishing is done by the Sinhalese in the south and west, especially by the Roman Catholic community, who are most numerous between Colombo and Negombo, and by Tamils and Moormen in the north and east. During the south-west monsoon, when the sea is too rough for small boats to work in safety on the south-west coast, many of the fishers migrate to the north-east coast and form temporary camps between Mullaittivu and Batticaloa. Thus the west coast fisheries are mainly confined to the months November to May, while those on the east coast are more important between May and December. The fishermen of Ceylon are exceedingly skilful, and have a great variety of methods of catching fish. A large number of different contrivances are in use, which vary with the different races and according to the type of fish caught or any particular difficulties of the neighbourhood. Tamil implements also differ considerably from those of the Sinhalese. Some of the most important methods are as follows :

(*a*) Net fishing from the shore. This is done by fixing a net by means of a long rope to a point on the beach, the other end being attached to a boat which goes out into the water. If the water is shallow the boat may be fixed to a rock or held by men standing in the water. The fishermen study the movements of the fish and put out the net when they think a shoal is coming along. This method is mainly used for catching small fishes like haalmessa during the months from August to April ; it can only be done in comparatively clear stretches of water as at Panadure.

(*b*) Net fishing from catamarans. This is also used for catching the smaller surface fishes near the shore, mainly those of the sardine family. A few logs about twenty-five feet long are attached together by a coir yarn, and on them is erected a short mast with a triangular sail ; short lengths of drift net are put out, which are dragged behind the raft as it moves along in the shallow water. This method is in use nearly everywhere ; it is especially developed by the Jaffna Tamils, who use catamarans more than outrigger canoes.

(*c*) Line fishing from outrigger canoes. This is conducted in deeper water, sometimes as much as twenty miles from the shore, often by fleets of canoes. It is used mainly for catching the larger mid-water fish like the seer. The outrigger canoes of Ceylon are very picturesque, and quite characteristic of the

island. They are carved out of the trunk of a jak tree, and have a log attached to one side by two staves of wood, to balance them. They can either be paddled along with a sort of oar, or navigated by means of a sail, which enables them to move with great speed in a favourable wind. Line fishing is also done in a small way by villagers—from the shore, or in the river estuaries.

FIG. 75.
Fishing Boats at Dondra.

(*d*) Prawns, crabs and lobsters are caught near the shore, by means of numerous small appliances which are very ingenious. One method of taking crabs is very interesting. The fisherman goes out at night when it is dark on the beach and the crabs are crawling about near the water in security, having come out of the deep holes in which they hide during the day. He carries a large torch, made of the stem of a coconut leaf, and walks along the beach waving it about. As he spies a large crab he nimbly scoops it up into the bag on his back.

(*e*) Traps are commonly used in the mouths of rivers. These are usually made by driving stakes of wood into the river bed ; they are placed in such a way that the fish, when moving either up or down stream, will pass into the entrance of the trap and find themselves in an enclosure from which they cannot escape.

(*f*) Trawler fishing by the Government Department of Fisheries.

The **curing of fish** used to be quite common in Ceylon, but has greatly decreased in recent years, and is now only done in places which are not near a rail head, *e.g.* on the east coast, and the west coast, north of Chilaw. If the fishermen can sell their fresh fish immediately they naturally will not take the trouble to dry it, so that nearly all the dried fish used in Ceylon is imported. There is a relatively large demand for fish as so many people prefer it to meat ; and owing to the difficulty of transporting fresh fish inland in a hot climate, or of keeping it at all in any part of the island, there has always been a great demand for dried fish. This is no doubt the reason why Maldive fish has become a staple article of diet ; it is quite hard, will keep indefinitely, and can be transported by the most simple methods ; at the same time it forms a tasty addition to a rice diet, and is very suitable for the making of sambal. It has always been a great boon to the poorer people in the countries of South Asia. Considering that more than Rs.15,000,000 is being spent in a single year on dried fish from the Maldive Islands and South India, there seems to be plenty of scope for the improvement of the Ceylon fisheries. According to the estimates of Government experts, a good deal of this fish could be obtained from Ceylon waters and prepared in the island. The tank and river fisheries inland are not very well developed, so that many people find it very difficult to get fresh fish at all. It is thought that as rail and motor transport increases there will be a much greater demand for fresh fish. This, of course, will never replace the dried fish, as it is used quite differently ; but it will probably be used a good deal instead of meat for curries.

The **pearl fisheries** of Ceylon are world-famous on account of their great antiquity and the excellence of the pearls produced. They have been carried on under much the same conditions for between two and three thousand years, and Ceylon pearls were possibly the most highly prized articles in the early Asiatic trade. Constant reference is made to these fisheries in historical and geographical literature, and the origin of the pearl in the oyster has greatly intrigued many travellers and scientists who have visited Ceylon ; one of the most amusing references to the origin of pearls has already been quoted in this book in the section on Historical Geography. There has always been a certain

amount of mystery connected with the intermittent periods of unproductiveness in these fisheries, which has obtained since very early times. Modern research has made clear the fact that the pearls are formed round any irritating particle—organic or inorganic—which may occur between the outer body surface and the shell of the oyster ; but it is even now not at all clear why there should be

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FIG. 76.

Pearl Divers preparing to plunge.

such long barren periods of as many as seventeen years (*e.g.* 1908 to 1925) during which the pearl production very seriously diminishes. One of the greatest hauls in modern times was in 1905, when it was estimated that $81\frac{1}{2}$ million oysters were taken out of the sea, and the pearls realised about $3\frac{1}{2}$ million rupees. In the olden days the pearl fisheries belonged to the king, who had the banks inspected periodically, and gave permission to

divers to work. This right was transferred to the Ceylon Government, who use the profits of the pearl fisheries as a means of obtaining revenue. The Government Fisheries Department is responsible for inspecting the pearl banks twice a year and for doing the necessary research work to improve the fisheries. One-third of the oyster catch goes to the divers and their mates, and two-thirds to the Government. The situation of the pearl banks between Mannar and Puttalam is shown in Fig. 15. The oysters are found on the rocky banks, or "paars," about five to nine fathoms from the surface. When the Government officials consider that there are sufficient pearls to warrant a fishery, they announce it in advance so as to warn the divers, and it is usually held during the inter-monsoon period between February and April. A camp is established and organised by the Government at Marichchukkaddi to accommodate the divers and other workers who attend the fishery. At the last fishery, in 1925, about 15,000 people visited the camp in some capacity or other ; a large proportion of these would only remain for a short period. There were over 2,000 divers, three-quarters of whom were Tamils from South India, especially from the town of Kilakarai, which supplied 1153. There were just over 315 Arabs, many of whom came from the Persian Gulf, while Ceylon supplied only 173 divers, who came either from Jaffna or Colombo. The diving was done on thirty-seven days, and during that time nearly 16,000,000 oysters were brought up, and the Government share of the oysters realised nearly half a million rupees. The camp is a very busy place while the fishery is in full swing ; shops are established, and water is brought from a neighbouring tank, which is kept specially clean for the purpose. The oysters are sold in heaps or lots by auction, and as nobody knows how many gems he will get the purchase is quite a gamble. The pearl merchants are mainly Moors.

Two other kinds of oysters are found in the waters around Ceylon ; one is an edible oyster, which is found mainly in the estuaries of rivers and is much liked by Europeans, but hardly ever used by the Sinhalese ; the other is called the "window-pane oyster," because the shells are used in some parts of the world, though not in Ceylon, for making small window panes. The chief breeding-ground is the shallow back-water known as Tamblegam Bay, which opens into Trincomalee Harbour. The diving is done chiefly by Moormen from the village of Kinniyai. The pearls are irregular in shape, have not such a good lustre as ordinary pearls, and are used for cheap jewellery in Ceylon. They are sometimes ground to a powder and used for medicinal purposes, as

well as for chewing with betel, a practice which was apparently cultivated in ancient days by wealthy people as we see from the quotation in the chapter on Historical Geography.

Another special shell fishery is carried on in Palk Strait. Here is found the chank shell, which is used by Hindus for cheap bangles, and also in Temple ceremonies. Most of the divers come from India, where there are large beds near Tuticorin. About 1½ millions of chanks are obtained annually from the Ceylon beds, and they usually yield about three times as many as the Indian beds.

The sea slug, or bêche-de-mer, is also found in Ceylon waters, the better kinds being near Jaffna. This animal when dried is greatly prized by the Chinese as a food, and was formerly obtained in considerable numbers by the fishermen of Jaffna for export purposes. Latterly, however, this fishery has almost died out.

The Government has been trying during recent years to find out how the fisheries of Ceylon might be improved. The population is steadily increasing, and it is evident that there is so much fish in the neighbourhood of Ceylon that the whole population could easily be supplied if encouragement were given to the industry. It would then be unnecessary to spend so much money outside the island on imported fish. Three suggestions have so far been made :

(*a*) The spread of knowledge on the subject of cold storage and the encouragement of the dried fish industry.

(*b*) The making of surveys of the seas further afield which have not yet been used by Ceylon fishermen, and the introduction of new methods of deep-sea fishing.

(*c*) The attempt to draw into the fishing industry more educated people, who would develop it on a bigger scale.

The spread of knowledge of cold storage would make it possible for fish to be kept for long periods and transported to all parts of the island. The curing of fish could only be done on a big scale by people with capital, because under present conditions a poor fisherman makes more money with less work by selling his fish fresh, if he is near the railway ; so that there is no stimulus for the production of dried fish amongst independent fishermen. It will be seen, however, that as there is such a large settled demand for this product which has become a traditional article of diet, it ought to be profitable to produce it on a large scale.

A great many investigations have been made by the Government Fisheries Department with the object of finding out whether deep-sea fisheries could be developed. It has been discovered that there are two very extensive, deep-sea

fishing banks within easy reach of Ceylon (see Fig. 15) ; one, which they call the Pedro Bank, has an area of 650 square miles and lies within a few hours' sailing of Kankesanturai ; the other, called the Wadge Bank, is across the Gulf of Mannar, off Cape Comorin, within eighteen hours' steaming of Colombo, and occupies an area of over 2500 square miles. In order to fish on these banks, a new method of fishing, called trawling, would have to be introduced. This method is used by the fishermen of many other countries for working on large submarine banks, such as the Newfoundland banks in the Atlantic or the Dogger Bank in the North Sea, near Britain. Small steamers carrying very large nets sail out to the banks and drag the nets along the floor of the sea. The steamers are equipped with ample storage room and refrigerators, by means of which the fish can be kept for a long period. It is possible to keep fish in good condition for over six months by this method ; in fact fish caught in the North Sea is regularly imported into Ceylon for the European population. The Government recently bought a trawler, and good catches have been made during the last few years. This idea of developing more elaborately organised deep-sea fisheries leads us on to the consideration of point (*c*), the question of the class of people who take up fishing. The Sinhalese are not inherently a seafaring nation, partly, perhaps, because their country was self-supporting and thus they had little stimulus to obtain other supplies. They have not the same love of seafaring and navigation that exists in many island peoples, so that the navigation of large vessels would be new to them and could only be taken up by comparatively well-educated people. In the past fishing was always done on a small scale, and the work was practically confined to the fisher caste. Now that the caste system is breaking up, there is no definite section of the community who have to specialise in this particular work ; and near Colombo there is a tendency for the sons of fishermen to seek work in the town, because it is better paid and they get more leisure. There is a great tendency also for the rapidly growing class of highly-educated people to enter such professions as law or medicine rather than turn their attention to problems of manual labour. There will no doubt soon come a stage when it will be realised that well-educated people can do many forms of work better than others, because they can think out labour-saving devices and, superior organisation. These are the people who are required to improve the fisheries of Ceylon ; and rich people can help by using their spare money to invest in the purchase of boats and equipment, which the poor fishers could never afford.

PART III. CHAPTER 5

MANUFACTURES, INDUSTRIES AND TRADE

CEYLON has practically no manufactures comparable with those of the industrial countries in Europe and America. Agriculture, which concerns itself with the supply of food and raw material to the industrial countries, is the main work of the people. In ancient times Ceylon was noted for the skill of its workmen in many branches of **hand-work**, all of which was done in a small way in the home or organised by the kings for large public works. Gem cutting, metal work, weaving, and carving in stone, are perhaps the most important of these industries. The advent of the industrial revolution in Western Europe, and particularly in Britain, had the effect of rendering available to the whole world an incredible number of commodities at a very low price. These rapidly invaded Ceylon, much to the detriment of the home industries, and their entrance was rendered the more easy because of the state of chaos into which the country had fallen during the European invasions. It is a wonder that the home industries ever survived at all. Two types of work, however, have been found sufficiently lucrative, on account of sales to foreigners, to ensure their continuance. These are jewellery work and brass carving. Ceylon jewellers are very skilful in cutting gold and silver and in setting gems, a branch of industry in which hand work is practically always superior to that done by machine. There is a jeweller in nearly every village ; and in such places as Galle, Ambalangoda, Kalutara, Panadure, Kandy and Jaffna, there are workers of very high excellence. In recent years there has been a great movement in India as well as in Ceylon to encourage the revival of home industries. European traders have introduced large quantities of manufactured articles into this part of the world at very cheap rates, which have attracted the comparatively poor agricultural population. These people have given up their home industries in order to grow raw material to exchange for the manufactured goods. Many people, however, have lately come to think that the decay of home industries has been a disadvantage in the Indian area because it takes so much

money out of the countries concerned, and has meant loss of work to a large number of people who formerly made such things as cloth, pottery, and metal goods for their own countrymen. In addition to this, it has been realised that hand-made articles are often superior to machine-made goods, and that the decay of this sort of work leads to the decay of indigenous art. It is a good thing for any country to have a distinctive art, and it is obviously a serious waste not to utilise the ability of some of the most highly-skilled hand-workers in the world. The work of ordinary villagers of Ceylon is often shown in foreign museums as representing a high standard in art, and many articles in every-day use which have been made by villagers are carried away from the island to be used in the homes of the rich people of other countries for decorative purposes, on account of the beauty in their design. The ordinary water-pots for getting water from the well, which people think nothing of in Ceylon, are thus valued abroad, and make some of the ugly productions of modern commercialism look very inferior indeed; in fact, it is almost true to say that so dissatisfied have the people become in many parts of the world with cheap and ugly manufactured articles of uniform design, that a strong reaction in the direction of hand-work is developing. Efforts are now being made, therefore, on the part of the Government and on the part of scholars and wealthy people interested in the welfare of Ceylon, to revive the home industries.

One very useful form of work is **lacquer**, for which in the past Ceylon ranked with Japan as producing the best work in the world. Lac is produced by an insect around the twigs of certain trees in the forests of India, and it is the best substance for preserving wood, being the basis of the material called varnish. As a rule in most countries varnish has been used on top of or instead of paint, and never combined with colouring. In certain countries of Asia the people long ago discovered a method of combining colour with lac so as to produce the hardest and most effective protection for wood. The knowledge was kept a secret by those who discovered it, and only handed on to members of their own family or tribe; other people made inferior imitations, and in Ceylon there have always been two kinds of lac, the better being made by the secret process. In recent years there has been a great danger of this knowledge dying out, because it is restricted to so few families. Various unsuccessful attempts have been made to induce them to reveal their secret, but all to no avail; belief in maintaining the secret is evidently mixed with some kind of superstition. The best lac work is done in the village of Angurumaduwa in Tangalle District.

It has, however, in late years been done on very poor cabinet work, which detracts greatly from its value.

The **carpenters** of Ceylon are justly noted for their good work ; Moratuwa is particularly important for the trade in wood and for its carpenters. Galle and Dodanduwa have a reputation for good wood carving. The Kalutara industry of making **bags** and **baskets**, hats and mats, from the leaves of a small species of date palm, and also from certain rushes, has greatly revived during recent years. The decorative hand-bags and baskets are much in demand by foreigners visiting the island, and a large number are sold in the shops of Colombo. Batticaloa is similarly noted for a characteristic form of basket and mat work made from certain rushes or the leaves of the palmyra palm. In Colombo there is a considerable industry in the making of **woven cane chairs**, the cane for which is nearly all imported from Singapore. There has always been a certain amount of work in **tortoiseshell**, particularly at Galle, but this trade is somewhat limited because the animals are becoming scarce along that coast.

The very characteristic **brass work** of Kandy, which is known all over the world, has been revived during recent years as a result of the work of the Kandy Museum and the Home Industries Society. Excellent articles in both brass and silver are now being produced by the workmen employed at the Museum, and this has been the means of encouraging other people in the district who have learnt the methods used at Kandy. Artists have been studying old designs so as to make all the work that is turned out characteristically Ceylonese.

Stone cutting and painting on stone had almost died out, but are now being revived. It is evident from the beautiful work in the new Hindu Temple in Sea Street, Colombo, that the modern stone carvers are not far behind their ancestors in skill. They are generally settlers from South India.

Where **pottery** is concerned, Ceylon has been remarkable more for its designs than for the excellence of the ware itself. For reasons already explained, it is not easy to make porcelain from Ceylon china clay ; the tendency therefore has been to develop earthenware in place of porcelain. It has, however, remained somewhat primitive from lack of the knowledge of glazing, which has only recently been introduced. Earthenware pottery for water-pots, cooking vessels, etc., is made nearly all over the island.

The making of **coir matting** and **rope** is another home industry which has been carried on since very ancient times and is particularly important on the western lowlands. Weaving has long been on the decline, except

in Jaffna and some of the more remote villages. It is felt at the present that Ceylon hand-woven cotton or silk can never hope to compete with the British machine-made product for ordinary clothing, but suggestions have been put forward and efforts are being made to encourage the production of very distinctive high-grade silk cloth with gold-thread embroidery for expensive sarees, of the type made in India. Unless this work receives considerable financial support from the wealthier classes, it cannot possibly succeed, because the people who do the weaving have not the capital necessary to buy such expensive materials. On the other hand, the making of **lace**, which may be regarded as a form of weaving, has survived as a leisure occupation among women nearly everywhere. The designs characteristic of Ceylon have fallen into decay owing to the copying of European styles. The tendency now, however, as with all other goods, is to revive the old designs.

FIG. 77.

Red Earthenware Water-pot made by Village Potters. The darker portion is covered with rough glaze, on which the pattern has been scratched. The original was taken home to England by the author, where it was much admired.

Machinery and **factories** are not yet common in Ceylon. Under the stimulus of war-time scarcities and high prices intensified by the imposition of controls, the imperative need for conservation of shipping space and stringent economy in foreign exchange, industrial development has made steady progress. A number of factories have been established. The Coir Factory was begun in 1939, followed by the Plywood Factory in 1941, a Shoe Factory and Tannery in 1941, a Glass Factory, a factory to manufacture acetic acid, a Steel Rolling Factory in 1942, a Paper Mill and a Quinine Factory in 1943, the Ceramic Factory in 1944, and lastly, the 12 million rupees Cement Factory which is now under active construction. More will no doubt develop later when cheap hydro-electric

power becomes available. A number of those in Colombo have machinery for extracting coconut oil or for making coir matting and rope. Others are connected with such necessary work as printing, and the repair of motor-cars, ships' machinery, tools, or estate machinery. Small factories have been started from time to time for the production of certain commodities, *e.g.* matches and chocolate ; they have usually found it quite impossible to compete with the large European firms who have almost a world monopoly of these commodities.

Trade

The exports of Ceylon have all been dealt with in connection with the agricultural products. The amount of trade is steadily increasing. In 1927 the total trade amounted to over 800 million rupees, the exports exceeding the imports by about one-third. " In 1946 the total trade amounted to over 1300 million rupees, with exports slightly more than the imports. The war made substantial changes in the regional distribution of trade as well as in the content of trade. To what extent these changes are permanent cannot be predicted yet. The exigencies of the war have given rise to industries both in this country as well as abroad, and it is likely that the character of the foreign trade of Ceylon might undergo further changes. For instance, under the impetus provided by the scarcity of imported rice, rice cultivation in Ceylon has received a great fillip. A certain amount of industrialisation, both private and Government, has taken place under the same stimulus. Therefore, Ceylon might not be as dependent as she was formerly on sources abroad for her food and manufactured products. Similarly, Ceylon has been buying more from India and Australia during the war, chiefly on account of the disappearance of Japan as a market. The change in the direction of trade thus brought about may last long."

Ceylon is the first exporter of coconut produce in the British Empire, the second tea producer, the third rubber producer ; it is first in the production of cinnamon and citronella, and produces the highest-grade cocoa in the world. The number of vessels entering Colombo Harbour is steadily increasing, especially since the installation of an oil depot for the supply of ships which run on oil instead of coal ; this development has increased the import of oil from the Dutch East Indies. Colombo is also a cable and wireless station (see Fig. 78), and is fast becoming an important airport.

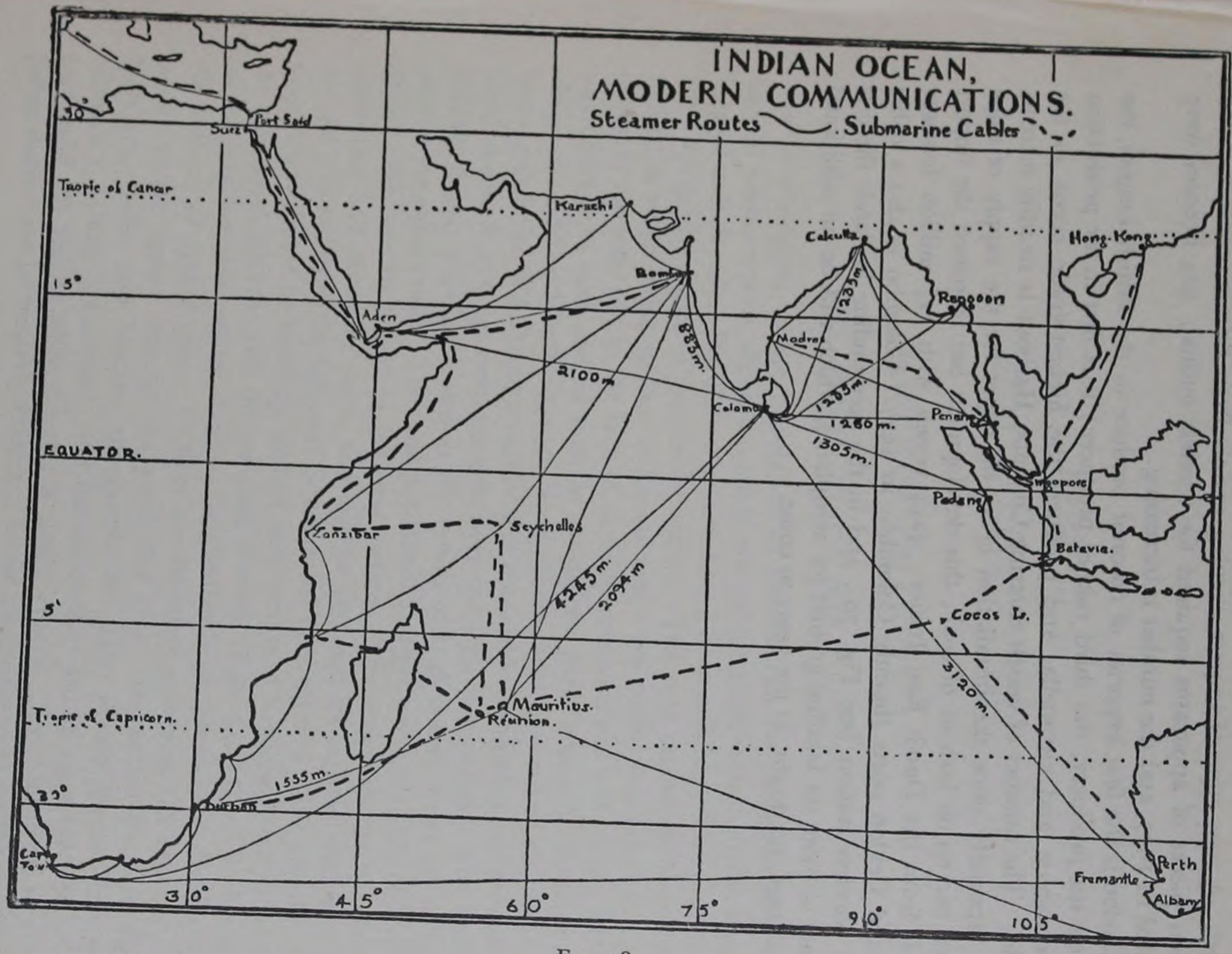

FIG. 78.

Many of the Ports have now become important Centres for Air Routes. The air route to Australia does not touch Colombo, but goes *via* Karachi and Rangoon.

tinned. A new type of import, coming mainly from Britain, consists of the various pieces of apparatus required for wireless outfits; 924 licences were granted in 1927, and the number is increasing.

Ceylon is the first exporter of coconut produce in the British Empire, the second tea producer, the third rubber producer; it is first in the production of cinnamon and citronella, and produces the highest-grade cocoa in the world. The number of vessels entering Colombo Harbour is steadily increasing, especially since the installation of an oil depot for the supply of ships which run on oil instead of coal; this development has increased the import of oil from the Dutch East Indies. 4244 vessels with $12\frac{3}{4}$ million tonnage entered Ceylon ports (mainly Colombo) in 1927. Colombo is also a cable and wireless station (see Fig. 78), and in the surrounding lowlands there is plenty of room for landing ground for aeroplanes, which will be an additional advantage, no doubt, in the years to come.

PART IV

HUMAN GEOGRAPHY

PART IV. CHAPTER 1

THE POPULATION OF CEYLON

THE facts relating to the population of Ceylon can be obtained from the various census reports which are made out by the Government at the beginning of each decade. Population statistics have been collected in Ceylon from 1871 to 1931 by means of decennial censuses. The 1931 census, however, was limited in scope owing to financial conditions. No census was taken in 1941 owing to the war, but as the lack of any accurate statistics was keenly felt, it was decided to take one as soon as conditions permitted. Accordingly, a census was held on March 19, 1946, from which it was ascertained that Ceylon had a population of 6,658,999 (exclusive of non-resident shipping and services), which meant a 25·5 per cent. increase over the 1931 population. The island is fairly thickly populated, and at the census of 1946 it had a density of 263 persons per square mile. The total population in 1931 was 5,312,548, of which 87 per cent. was rural and 13 per cent. urban. The census report is a most interesting and necessary work, and can be obtained by anyone who wishes to read it in full from the Office of Government Publications. The population map (1921) should be carefully studied and compared with the maps showing the average death rate and the malarial districts (Figs. 54, 13). The figures on the map are obtained by dividing the number of people in each district by the number of square miles. It does not therefore represent the number of people to the square mile in any particular area. In certain districts, *e.g.* Kalutara, Galle, and Matara, the people are fairly evenly spread, but in others, *e.g.* Jaffna, Trincomalee and Batticaloa they are all crowded into one portion of the district while the rest is almost empty. The conditions in the Jaffna district are particularly striking ; in the peninsular portion the number

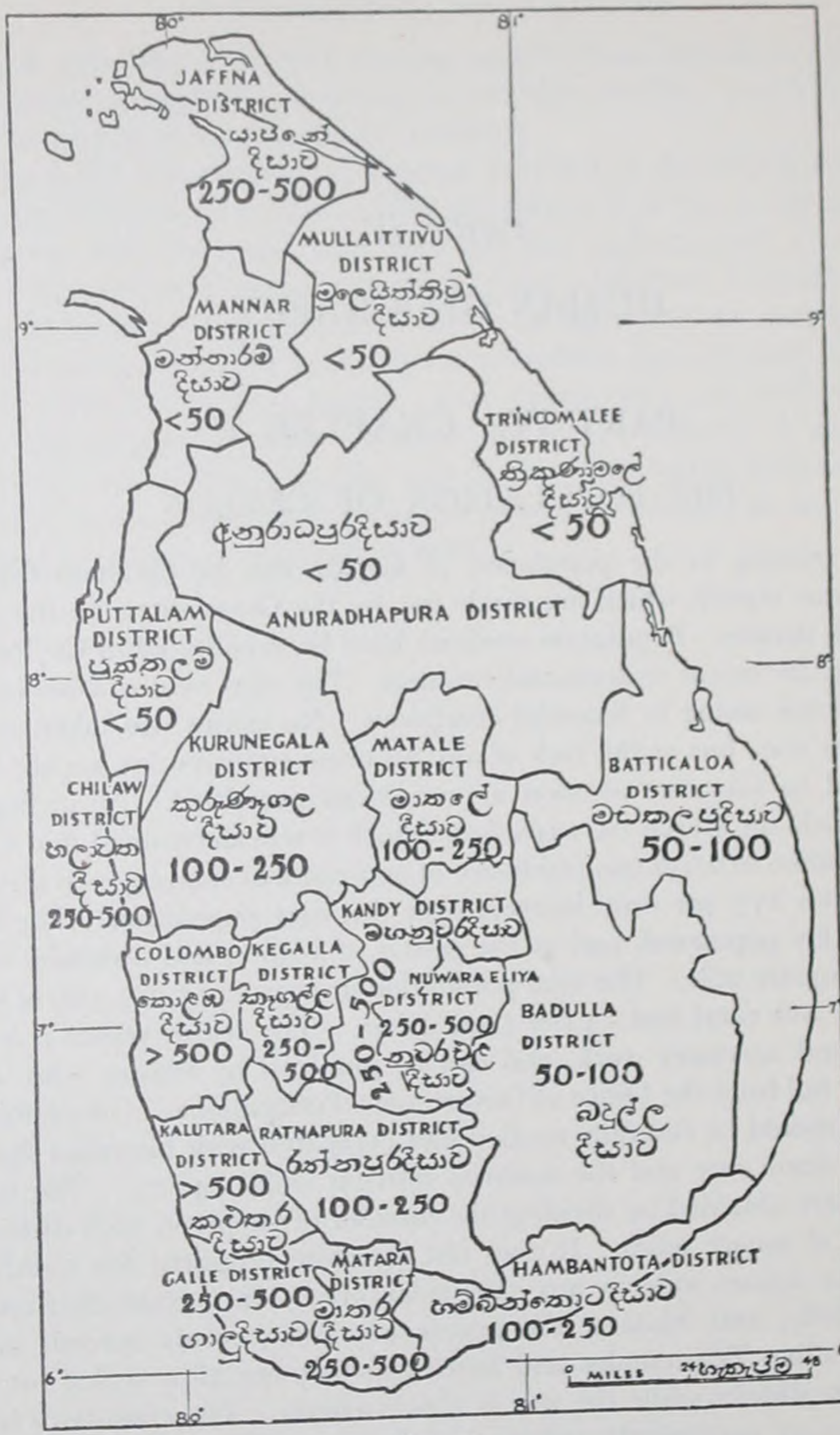

FIG. 79.

Average Number of People to the square mile in the different Districts of Ceylon.

probably exceeds 500 to the square mile, while in the mainland portion there are hardly twenty people to the square mile.

The proportion of the different races represented in each area is shown in the maps accompanying the chapter on Races.

Ceylon contained in 1921 4,504,549 persons in all, including men, women and children. The population appears to have increased more than fourfold during the last century. The males are slightly in excess of the females. For an agricultural country Ceylon has rather a large number of people to the square mile. The newly developed agricultural countries, like Canada and Australia, have a very sparse population. Australia, which is about 120 times as big as Ceylon, contains only about another million people ; on the other hand, the smaller industrial countries, like England and Belgium, have a much denser population than Ceylon. The older agricultural countries of south-east Asia have actually the biggest areas of dense population in the whole world ; these areas are mainly the alluvial lands, like the Ganges Basin, where rice can be cultivated. A population of over 250 to the square mile is very dense for an agricultural country, and is hardly possible in any area where crops cannot be cultivated all through the year. The Ganges Basin, for example, has a population of over 512 persons to the square mile, a very large proportion of whom are engaged in agriculture, either growing the crops or doing some form of work connected with their distribution and export.

When we come to examine the details of the density of population in Ceylon, we find that the people are very unevenly distributed. About one-third of its area has a very low population, and, as has already been pointed out, could be made to support many more people by the revival of the cultivation of paddy near the tanks. We have, however, in the western and south-western provinces an area which contains about a quarter of the total population in about one-seventh of its area. Of these people, nearly a million are crowded into one small region, the Colombo district, which is only one thirty-sixth of the area of the whole island. Furthermore, of these more than a quarter of a million are centred in the single town of Colombo (70 per cent. of the town dwellers of Ceylon are in Colombo). Ceylon therefore contains in the south-western portion of the low country a region which is comparable with any of the best portions of the monsoon countries ; this exceedingly productive area supports its population, like the Ganges Basin, in the growing and exporting of crops. The size of Colombo is, however, out of all proportion to the needs of the island itself in the way of export, on account of its position as a world trade depot.

Apart from Colombo the proportion of people to the square mile seems to depend upon several factors. The chief of these are as follows :

(*a*) The prevalence of the malarial mosquito ;
(*b*) the productivity of the soil ;
(*c*) the relief ;
(*d*) the rainfall ;
(*e*) the type of crop ;
(*f*) the relation to the ancient danger zones connected with European invasions.

Only 23 per cent. of the total area of Ceylon is now cultivated, though the amount is steadily increasing ; a good deal more than half could easily be cultivated. Rather more than four-fifths of the people are in smaller villages on the cultivated lands and are mainly engaged in occupations connected with agriculture ; the remaining one-fifth occupy the bigger towns and are more particularly engaged in trade, there being practically no industrial population at all. Comparison with England is interesting, because the relations are almost exactly reversed ; about four-fifths of the people of England are town dwellers and engaged in either mining, manufacture, or commerce, while the rest occupy the villages of the agricultural areas.

In the list of factors influencing the distribution of population, the malarial factor is an important one which has been, and still is, to a certain extent an obstacle to the development of about two-thirds of the area of the island. Great efforts are being made in the fight against malaria by the introduction of anti-malarial measures and the treatment of the disease by new remedies such as paludrine, etc., and complete eradication is almost in sight. But progress has been retarded owing to a number of causes, amongst which are the following :

(*a*) Many people are still illiterate and ignorant, though this ignorance is rapidly disappearing with the introduction of free tuition and compulsory elementary education.

(*b*) The type of education which has been provided by the various European Governments has hitherto been out of harmony with the ordinary home life of the people, so that children have not been in the habit of associating their school learning with the improvement of their home life.

(*c*) The villagers have been slow to appreciate the value of the Government Dispensaries, where quinine, the chief preventive remedy for malaria, could at any time be obtained free. A large number of the young men of the educated

classes in Ceylon have in recent years taken up the study of medicine, and no doubt in the course of the next few decades they will have a substantial influence upon the people at large.

What has been said above applies to a number of other diseases which greatly affect the nation as a whole. Hookworm affects about three-quarters of the population, and is the cause of a great deal of general debility and ill-health. It can be cured by medicines which are obtained free by those who will apply to the Government Dispensaries and carry out properly the suggested treatment ; yet so great is the ignorance of many people and their suspicion of Government institutions that they do not avail themselves of the benefit of these institutions. Ordinary house flies also cause the spread of a great deal of infection, yet many people have their kitchens and sanitary conveniences swarming with flies, which they do not care to kill, on religious grounds. The rat harbours a flea which is the carrier of plague, yet it is allowed to overrun the houses of many people ; here again the Government will help by supplying men to set traps and remove the dead bodies of the rats on application to a Sanitary Officer. There are, of course, many people who do not understand how diseases can be carried in this way, and have other views as to their causes. The proof of such a thing is surely to be sought in the study of results. The conquest of malaria, hookworm, and plague has never been accomplished in any country without the measures just described ; in certain tropical countries their reduction has been enormous since doctors in various parts of the world discovered how they were spread.

Of the other factors which influence the distribution of population in Ceylon, perhaps the most important is relief. It is quite obvious that there are many areas in the hill country which are not habitable because of the steepness of the slopes of the hills ; there is relatively quite a large amount of useless land which can never be populated, but the increase in tea-planting has completely changed old-established ideas in this direction. In olden days, and indeed up to about ninety years ago, it seemed likely that the population of the hill country would be confined to the valley floors where paddy cultivation is possible. We now find, however, vast areas in which the hills are completely cleared of all their forest and have planters' bungalows and labour lines on their slopes. This particularly applies to the Kandy, Hatton, and Nuwara Eliya Districts, where the population exceeds 250 to the square mile.

The Adam's Peak region seems to be the only area where the amount of rainfall is likely to influence the number of people. This is the rainiest part of

Ceylon, and during the south-west monsoon the slopes facing south-west are particularly uncomfortable for residence ; they have the wettest and densest forest and have as yet been very little cleared.

As regards the type of crop, it is quite obvious that more people can be supported by paddy land, which provides the staple food, than by any other crop ; this is partly due to the fact that it occupies most of the more productive soil, but also to the fact that the paddy land is so sub-divided into small estates, and that each small proprietor will naturally try to get the biggest return possible from his small piece of land. On the other hand, the crops like tea and rubber are grown on big estates, owned very often by people who are already wealthy and who can afford to leave land lying idle if they like. Rice has always, however, in Ceylon been the chief factor in determining the grouping of the population, as will be shown later.

Reference has already been made to the movement of the population into the south-west quarter of the island as a consequence of the successive invasions. The remarkable concentration of people into the south-west quarter of the low country probably results more from this factor than from any other. As the early people were driven from their cultivated lands in the north, they gradually moved to the hill country, but there was also a tendency for them to get down again on to the coast for purposes of trade. They came to the places most visited by the foreigners and developed the commodities which they knew they could sell. Batticaloa, Galle, and Colombo tended to become the chief depots for European trade ; the chief demand was for cinnamon, and in the neighbourhood of all these three ports large areas of land were cleared for this crop, many of which have now been utilised for other purposes. At the present moment the cinnamon is mainly in the neighbourhood of Galle. It had, however, created an intercourse which led to the exchange of other articles, and meanwhile Ceylon was becoming one of the chief stations on the great European trade route to the Far East. Colombo was developing more and more as the pivotal point for all the routes of the Indian Ocean. The construction of an artificial harbour, giving it full accommodation for big ships, caused trade to focus on this side of the island, which proved to be altogether more accessible and richer than the Batticaloa side. Eventually Colombo became the seat of government of the Europeans, and this naturally led to a great improvement in the communications in that portion of the island. It is probably therefore largely a result of the European influence that the population has so much gravitated towards the south-west.

Finally, we must note that since agriculture is likely to remain the principal occupation of the people of Ceylon, there will always be a tendency for the people to be somewhat evenly spread, and the towns, apart from Colombo, to remain small. The export of surplus produce demands the development of ports and collecting centres. Such trade centres are always likely to constitute the bigger towns. Were it not for the world traffic on the Indian Ocean, the capital or biggest city would probably not greatly exceed Jaffna in size. The smallness of the island precludes the development of any other ports for external traffic.

The cultivation of tea and rubber is not so much responsible for the growth in population of the Sinhalese in the hill country as for the introduction of the new foreign element formed by the Indian Tamil labourers. In 1921 the number of Indian Tamils imported by the planters exceeded half a million, and their numbers, which were increasing for some years, exceeding three-quarters of a million in 1927, have been on the decline in recent years owing to the ban placed on emigration by the Indian Government.

In ancient times Ceylon is supposed to have supported a very much larger population than it has at the present day. Owing to the known exaggeration practised by the old historians, we cannot tell whether the numbers which they suggest are at all true. It does not take much imagination, however, to visualise what an effect the constant wars must have had in the reduction of the island's population. Soon after the arrival of the English it was estimated as being about three-quarters of a million, though it is a well-known fact that not all the people were counted ; if we are to believe the suggestions of the old historians, this represented the remains of a population which had once exceeded 20,000,000. Since the British occupation the establishment of settled peace has led to a steady growth, and it is hopeful to note that during the last century the numbers of the Sinhalese themselves, apart from the other races, have increased fourfold. This increase will no doubt continue. The standard of the race is also likely to improve on account of the great improvement in education ; people will learn how to combat the various diseases which are the natural accompaniment of a hot wet climate.

ESTIMATED NUMBERS OF THE DIFFERENT RACES IN 1927.

	Actual Numbers.	Proportionate Number in each 1000 of the Population.
Sinhalese - - - -	3,375,655	638·3
Tamils, Ceylon and Indian -	1,174,023	222·0
Moors - - - -	301,823	57·0
Burghers and Eurasians -	32,561	6·1
Malays - - - -	15,098	2·8
Europeans - - - -	11,447	2·2
Veddhas - - - -	4,518	·9
Other races - - - -	22,000	4·2

NUMBER OF PEOPLE IN THE LARGEST TOWNS IN 1921.

Colombo - -	244,163	Batticaloa - -	10,564
Jaffna - -	42,436	Kurunegala - -	10,187
Moratuwa - -	41,858	Trincomalee -	9,145
Galle - - -	39,073	Weligama - -	9,104
Kandy - -	32,562	Badulla - -	8,126
Negombo - -	27,639	Matale - -	7,865
Matara - -	16,779	Anuradhapura -	7,781
Kalutara - -	13,596	Nuwara Eliya -	7,525
Panadure - -	10,747	Ratnapura - -	7,014

NUMBERS OF THE DIFFERENT RACES IN 1946[1]

	Actual Numbers.	Proportionate Number in each 1000 of the Population.
Sinhalese - - - -	4,637,000	696·0
Tamils, Ceylon and Indian -	1,508,000	226·0
Moors and Malays - -	455,000	69·0
Burghers and Eurasians -	36,000	5·8
Europeans - - - -	5,000	·7
Veddhas - - - -	6,000	·9
Other races - - - -	17,000	1·6

[1] As the full Census Report has not been published, no final statistics can be given at this stage.

NUMBER OF PEOPLE IN THE LARGEST TOWNS IN 1946.

Colombo	364,106	Trincomalee	28,334
Jaffna	62,922	Matale	14,046
Kandy	50,381	Kurunegala	13,466
Moratuwa	50,093	Badulla	13,162
Galle	49,038	Batticaloa	12,948
Negombo	32,632	Ratnapura	12,467
Matara	23,493	Anuradhapura	12,287
Kalutara	18,244	Weligama	11,891
Panadure	16,545	Nuwara Eliya	9,840

NUMBER OF PEOPLE IN EACH ADMINISTRATIVE DISTRICT IN 1921.

Colombo, including Negombo	923,143	Western Province.
Kalutara	323,704	
Matale	116,584	Central Province.
Kandy	433,993	
Nuwara Eliya	167,162	
Galle	313,118	Southern Province.
Matara	238,509	
Hambantota	119,607	
Puttalam	35,610	North Western Province.
Kurunegala	354,197	
Chilaw	102,374	
Kegalla	268,839	Sabaragamuwa Province.
Ratnapura	202,975	
Jaffna	330,541	Northern Province.
Mannar	25,582	
Mullaittivu	18,706	
Badulla	233,864	Uva Province.
Trincomalee	34,112	Eastern Province.
Batticaloa	158,709	
Anuradhapura	96,525	North Central Province.

NUMBER OF PEOPLE IN EACH ADMINISTRATIVE DISTRICT IN 1946.

Colombo	1,141,427	Western Province.
Kalutara	458,198	
Matale	156,416	Central Province.
Kandy	709,654	
Nuwara Eliya	268,574	

NUMBER OF PEOPLE IN EACH ADMINISTRATIVE DISTRICT IN 1946—*continued.*

Galle	459,898	Southern Province.
Matara	352,260	
Hambantota	149,848	
Puttalam	43,293	North-Western Province.
Kurunegala	485,497	
Chilaw	139,402	
Kegalla	402,557	Sabaragamuwa Province.
Ratnapura	343,552	
Jaffna	424,815	Northern Province.
Mannar	23,137	
Vavuniya	31,507	
Badulla	373,059	Uva Province.
Trincomalee	76,107	Eastern Province.
Batticaloa	203,097	
Anuradhapura	139,581	North-Central Province.

PART IV. CHAPTER 2

EFFECTS OF THE CLIMATE ON HUMAN LIFE

CLIMATE influences the mode of life of man and also, to some extent, his physique, character, and habits. In strongly contrasting climatic regions we generally find great differences in human characteristics which appear to be the result of climatic control. The extent of this control, however, has often been over-rated by geographers who are not sufficiently scientific in their methods. The influence on the mode of life is usually self-evident, but the effects of climate on the character of man and on civilisation in general are not easily susceptible of proof and hence must remain more or less controversial.

In Ceylon the most important controlling factors are rain and even heat, and of these the former is probably the more important. Man has to adapt himself and his activities in many ways in order to cope with the torrential rains. He has to place his residence so as to avoid floods and put up with surface drains on account of the danger of burst underground pipes after a storm. If he places his house unwisely on a flood plain he will be constantly impoverished by the damage of flood waters. The floods of the Kelani Ganga have rendered as many as 15,000 people temporarily homeless; all attempts to control these flood waters and divert them into other channels, so as to preserve the area behind Colombo, have so far proved ineffective. In the hill country the great problem is to prevent the flood waters from carrying away all the soil from the hill slopes. For these activities man has to organise himself, and if he fails to do so he remains poor or becomes the victim of some great natural catastrophe.

Rain often limits his activity. There are many favoured countries of low rainfall where work is but rarely interrupted by rain. In Ceylon it is frequently impossible to go out, vehicles cannot proceed on the roads, schools have to be closed, and nearly all activity may have to be suspended for some hours on account of the torrential rain. In contrast with this there are the regions of periodic drought in which water storage is necessary; this caused the development of the tanks and tank settlements.

Rain not only influences the situation of settlements but also the form of dwelling and methods of building. The over-hanging roof not only deflects the rain from the house walls but protects the interior from the sun's rays ; as convectional rain is most frequent the sides of buildings can be left open, as the rain falls almost vertically. In building a house the usual method is to get a roof constructed as soon as possible, otherwise the work may be demolished by a heavy shower ; hence it is common to erect corner supports for the roof and fill in the walls when the latter is completed.

The **high humidity** of the atmosphere is also an important factor in Ceylon. Hot moist air is favourable to the development of insects, fungus growths, and many noxious pests. Man has to protect himself and his belongings from the attacks of all these pests. This makes it harder to live than in places where things do not perish so easily, and many useful commodities have to be sacrificed. Wood is eaten away by white ants or other insects, while bugs flourish in wooden furniture. A fungus called mildew attacks leather articles and many fabrics, causing them to rot. All sorts of things are difficult to keep on account of the damp. No wonder, therefore, that the original peoples of Ceylon have a taste for the simple in their houses ! The interior arrangements of the average Ceylonese house are very different from those of colder lands, where the house often contains such a large collection of articles that it is difficult for the inhabitants to find room to move.

Of course there are many natural products of Ceylon which can be used in the climate without any deterioration. Though books made of ordinary paper bound with cardboard or leather are difficult to keep, the old ola-leaf books made of indigenous palm leaves have stood the test of time and are amongst the oldest books in the world. There are, indeed, many compensations. While there are days when washing clothes is impossible, as they will not dry, there are other occasions when they dry in the sun in a few minutes. In the moist heat people perspire freely and must frequently bathe and change their clothes ; water usually abounds and washing is pleasantly cooling. So the inhabitants of Ceylon, remarks an English writer, "are much addicted to bathing and washing," and perform their ablutions as far as possible out of doors. It would astonish a Ceylonese student, no doubt, to study the bathing practices of many other countries. In colder or drier lands many people go for months without a bath.

Moist heat makes plants grow easily, so that agriculture is comparatively easy, ; on the other hand it is greatly inimical to the breeding of animals, as they

are attacked by so many insect pests and disease germs. Pastoral life has never, therefore, been much developed in Ceylon, while agriculture is man's chief occupation and his round of life depends upon the needs of his particular crops.

The **lack of strong seasonal change** produces a remarkable monotony in the climate which seems to react upon human life. It tends to make life easy, as there is no need for man to vary his procedure at different times of the year; he can live economically, and as he lives in a climate of even heat he has fewer wants in the way of food, clothes, and housing than the people who inhabit lands of climatic variation. On the other hand, change is usually considered to be an essential stimulant to human progress, and man does not, perhaps, tend to think about change when he need not alter his food, clothes, or housing arrangements from one year's end to another. In such a climate, however, man can live a good deal out of doors. This greatly affects many of the personal habits of the people and is perhaps responsible for the lack of attention to the interior of the house which is characteristic of the Ceylonese. On the whole, it is probably true to say that the Ceylonese is cleaner in his person than the people of most other nations, but is rather less careful about the cleanliness of his house ; the latter characteristic may, however, be also due to a tendency to physical inertia which will be discussed later.

The peoples of equatorial lands usually exhibit some **physical adaptations** to the climate. The most obvious of these is the dark skin ; this contains a large amount of dark colouring matter which absorbs many of the sun's rays and prevents them from reaching the more sensitive tissues underneath. The white man, who comes from lands of weaker insolation, has to invent artificial means of protection from the sun's rays. His nervous system is very easily damaged by bright sunshine and he contracts a disease called "sunstroke" if he fails to cover his head and neck with a pith helmet (or "topee"). His skin also becomes blistered and burnt by the sun if he does not cover it sufficiently, while a dark brown or black man can remain unclothed all day in the equatorial sunshine without any damage to his skin. Apart from the definite disease of sunstroke the white man usually suffers from indefinite nervous disorders if he remains too long in equatorial lands ; he usually returns home for a long rest after several years in the tropics—if for no other reason, to restore his nervous equilibrium. The skull of the Ceylonese is slightly thicker than that of the white man, and this is an additional protection.

The skin and lungs of equatorial peoples are also adapted to the hot moist atmosphere. Hot moist air has a lower pressure of oxygen per cubic foot than

cold dry air. The white man, born in a colder, drier atmosphere, is accustomed to using oxygen for respiration at a higher pressure than that occurring in Ceylon ; hence he has to adapt himself to the new conditions and must do everything more slowly than at home. The skin of the Ceylonese, also, has become used to moist air where little evaporation takes place. The skin is the chief regulator of bodily temperature ; it acts in two ways : (*a*) by giving out perspiration which evaporates and causes a decrease in temperature by taking heat from the tissues for the process of evaporation, (*b*) by causing an enlargement or contraction of the small blood vessels near the surface so that more or less blood can be under the cooling influence of external factors. The chief difficulty in hot moist climates is the high humidity of the atmosphere, which prevents evaporation. The people who are native to Ceylon do not perspire so freely as the white man and hence do not suffer so badly from the lack of evaporation of their perspiration. They have also grown accustomed to having the blood vessels near the skin more or less permanently dilated. The white man may become hardened to the strain imposed upon his skin, but he is always likely to suffer from debility owing to the strain of the new conditions. The Ceylonese adapts himself physically by doing everything more slowly than is customary in colder lands. " The apparent slowness with which things are done " in hot lands, says Dr. Balfour Kirk, a great authority on tropical medicine, " is the slowness of endurance, not of lethargy." The Ceylonese conserves his energy and has a much more calm and placid manner than the peoples of colder lands. He does not require all the minor forms of bodily activity which help to maintain warmth in colder countries. The difference is very marked in young children, who react more clearly to physical factors than adults. The English boy, for example, is overflowing with bodily vigour and always likes to be exercising his limbs ; if there is nothing more profitable to do he will wrestle and fight with his mates as a pastime. He hates to sit still and likes noise, motion, and activity. The Ceylon boy is quiet and likes to sit still ; he takes his exercise in a deliberate manner and usually only fights to settle a quarrel. A Ceylon crowd is exceptionally quiet and people move slowly in the street and have a general air of leisure ; people in cold countries are busy and alert, animated in the street, and bustle about their work—even their pleasures are strenuous. No ordinary European would ever endure, let alone enjoy, the long hours of bana preaching[1] or the lengthy meetings and speeches in which the average Ceylonese takes a delight ; the latter is capable

[1] Bana preaching = recital and exposition of Buddhist classics.

of sitting still for very long periods and of concentrating his mind on abstract subjects for a long time.

Apart from the physical factors, however, there seems to be no doubt that the general conditions obtaining in Ceylon tend to make people less active, and there is not quite the same stimulus to thrift and industry as there is in colder lands. Crops grow easily in a hot moist climate and it is easy to obtain the minimum of necessary food, which is less than in colder places. It is difficult for a man to die of starvation, especially as the traditional social customs provide for the feeding of the poor. Possibly also the bright sunshine tends to make people cheerful and inconsequent, so that the Ceylonese develops a more serene state of mind and does not worry about many of the things which agitate the minds of people who live in lands where life is more difficult and nature not so kind. The Ceylonese is, on the whole, better at thinking than acting, and it is significant to note that complete serenity of mind is an important Buddhist ideal.

One physical characteristic which is probably related to atmospheric conditions is the lack of development of the art of singing by the Ceylonese. People who live in a dry, bracing atmosphere usually have a spontaneous desire to sing. The vocal chords are extremely sensitive muscles which react very clearly to atmospheric conditions, and a hot moist atmosphere is very liable to make them become limp. Sinhalese vocal music has always been somewhat limited; singing and whistling are not common in the streets and are replaced by monotonous chanting which utilises a very small range of sounds.

Equatorial people are often described as lethargic or even lazy by people of colder lands, and these supposed characteristics are generally attributed to the effect of the climate. Statements relating to this subject are often found in European and American works, though they are becoming less frequent than formerly. It is certainly true that a large number of people in tropical countries suffer from lethargy, but this is only an indirect effect of the climate. As diseases like malaria and hookworm are so common in hot moist climates many people suffer from permanent debility which naturally makes them avoid excessive work and lack initiative. The incidence of disease is much greater in hot moist countries than in cold ones. The average Ceylonese when in good health, and especially when quite free from malaria or hookworm, is exceptionally energetic; he is capable of long hours of work and can work much longer than a white man in the same climate. He seldom sleeps in the middle of the day as many Europeans imagine he does; if an agricultural labourer he may take a noonday siesta, because he has risen so early in the morning and works

late into the evening. Boys of Ceylon play such a strenuous game as football with quite as much vigour as English boys, even with the sun overhead at noon. In other countries the inhabitant of Ceylon competes with credit with other people, especially in brain work, and does not appear to have any less vigour than the inhabitants of colder lands. What has probably misled the authors of these statements is the fact that equatorial peoples dominated by Europeans do not always take to the kind of work required by their conquerors. It must be noted that Europeans have rarely been able to undertake anything more than the direction of work in hot moist countries ; they usually work for short hours and all the hard manual labour is done by the people belonging to the country. Attempts have been made to compare the hours of work, as in Elsworth Huntington's *Climate and Civilisation*, but they are mainly comparisons of industrial work. A comparison of the hours and amount of labour in outdoor work, especially in agricultural labour, between people like the Negroes or Sinhalese and the English, in hot moist climates, would doubtless prove to be in favour of the former and not the latter. For reasons already explained their labour is not so intensive, but the European often ruins his health in the tropics by working too intensively at first and eventually becomes even more lethargic than his employees.

In connection with this subject it is interesting to note that equatorial people are often described as unemotional. The varying moods and passions of more active northern races do not seem to exist in equatorial peoples. This sort of thing is difficult to prove, though it is possibly true ; the conservation of energy may be just as necessary emotionally as physically—indeed the emotional and the physical life can hardly be separated. It must be remembered, however, that many racial features have nothing whatever to do with climate. The Chinese maintains the same impassive exterior whether he lives at Singapore or at Pekin. There are very many racial characteristics which cannot be explained away on climatic grounds. If the same characteristics develop in different races living in the same climate we are possibly safe in attributing them to climatic influence. In Ceylon there are several different races, but they have much in common as they have the same geographical setting ; the Moors, who are partly of Arab descent and hence came originally from a completely different environment, have developed many characteristics similar to those of the Sinhalese and Tamils. The English, a radically different race, also develop some of the same characteristics if they remain long in residence in Ceylon.

We now come to the more difficult question of the effects of climate on the **standard of civilisation.** Ceylonese students of geography who read works in the English language will have been astonished to find statements to the effect that equatorial peoples are incapable, on account of the climate, of rising to a high level of civilisation. These sweeping generalisations are always risky, and in the past they have often been based upon a wholly insufficient study of the conditions and influenced by a biased notion of the meaning of civilisation.

The term " civilisation " is possibly one of the vaguest words in the English language, and so indeed is its equivalent in any other language. People use it with their own individual meaning and seldom do we find two people who mean the same by it. One thing it generally implies is evolution—that is, the gradual development from the primitive to a higher state ; but as ideals of what human characteristics are worth cultivating vary between one individual and another, and still more between one nation and another, it is hard to decide which nation has reached the highest level. The inhabitants of every state, no matter how small or how primitive, usually at heart believe their own people to be the best ; and who is to be the final judge ? Life is a very big thing and nations develop differently, some emphasising one idea at one particular period of their history and some another. Climate certainly creates difficulties, and the extent to which man flourishes physically, mentally, and spiritually in spite of these difficulties is possibly some measure of his level of civilisation. Some climates seem to make life easier because they have moderate conditions which impose less strain upon man. This is popularly supposed to have favoured the development of civilisation in Britain. There are certain things in life, however, which it is almost impossible to compare, and the wise geographer confines himself to facts and avoids generalisations that are not based upon well-considered study. Nations that have advanced in civilisation in one direction are often quite barbarous in another ; some peoples have evolved a satisfactory mode of life and adapted themselves perfectly to the most difficult conditions in such a way as to be of great use to the world, and yet their development may be quite stunted in certain directions.

The complexity of the problem is best illustrated by a few examples. The British people generally assume that they are the most " advanced " nation in the world. They are justly proud of their explorers, who have contributed greatly to geographical knowledge. Several other European nations have a similar idea of their own distinction. The success of European Arctic explorers has been largely due to the Eskimos, who have evolved a mode of life

remarkably adapted to Arctic conditions and are noted for their healthy, happy existence. The Eskimos have been considered as low in the scale of civilisation by many Europeans, largely because the rigorous climate prevented their development; this view was based partly on the fact that they had very little written literature and little scientific knowledge of the type cultivated by Europeans. The Eskimos had developed, however, in another direction, and their knowledge of hunting and fishing and keeping good health in Arctic lands is unrivalled. When the British, Norwegians, Americans, and others had learnt about the Arctic lands they began to develop the fur trade, and their barbarity in the pursuit of this trade would have caused the extermination of the Eskimos had not another nation, the Danes, who were developing on other lines, intervened on behalf of this small but useful community by causing a control to be put upon the activity of fur traders.

At the end of a survey of the contribution of different nations to world civilisation it is very difficult to say which nation is really the most civilised. It is still more difficult to say how much their civilisation is controlled by climate. As already suggested, a large number of racial characteristics appear to be totally independent of climate and to persist in any part of the world. If we compare the Ceylonese with the other peoples who live near the Equator—*e.g.* South American Indians, Negroes, Pygmies, Javanese, and Papuans—we find that though the climate is very similar in the countries they inhabit they have developed very differently. It is significant to note, however, that the races that would appear to be the most backward are those which have had least contact with the rest of the world. Contact with other cultures is probably a much more important factor than climate in the development of civilisation. In this respect Ceylon has been particularly lucky—and so has Britain—though its contact with other cultures is much more long-standing than that of Britain. The Ceylonese have, however, always remained more passive that the British; the latter have during the last century absorbed ideas from almost every country in the world by active exploration, while the Ceylonese have usually waited for other people to come to them. It is very tempting to suggest that these characteristics are due to the influence of the climate of the respective countries, but almost impossible to prove.

PART IV. CHAPTER 3

THE RACES OF CEYLON

CEYLON has evidently been inhabited for a very long time. Not many traces of the prehistoric inhabitants have yet been discovered, but it is evident that Stone Age men inhabited the island several thousand years B.C. The chief remains of these people consist of tiny quartz implements found in caves ; a collection of these may be seen in the Colombo Museum. Chipping grounds, where the instruments were obviously made, are to be found on a number of the hills in the jungles. The ancient Indian legendary history called the Ramayana, supposed to deal with a period as early as 2000 years B.C., seems to indicate that there were inhabitants in Ceylon who had relations with the mainland and were not altogether uncivilised, even at that early date. The Mahawansa only begins in the sixth century B.C., with the arrival of the ancestors of the Sinhalese, and at this date there appears to have been a number of people living in a comparatively primitive fashion, who were called by the invaders Yakkhas, or Nagas. They seem to have been hunting people, who did not know much about cultivation, and were quite different from the chief races on the mainland. It is probable that these were the remnants of a race which also inhabited the Dekkan at a very early date, and was driven southwards by the people called Dravidians, who later became, and still remain, the chief inhabitants of the Dekkan. They would survive longer on the island, cut off from the mainland. The ancient people are usually referred to as the pre-Dravidians, as no separate name for them has been discovered in historical documents ; they appear to have developed no literature, though they evidently had a distinctive spoken language. The descendants of Vijaya appear to have driven these pre-Dravidian people into the poorer parts of the island, where they hid themselves in the jungle, and it is thought that the **Veddhas** of the present day are possibly their modern survivals.

At the 1946 census the Veddhas were estimated as numbering 6000 ; it is not easy to estimate the exact number, because many of them wander about in

inaccessible parts of the eastern forests. There are a few in the North Central Province, but the chief Veddha country is situated in the Eastern Province in the Bintenne country to the east of Alutnuwara and Bibile in the upper reaches of the Gal and Maduru Oyas. They have for many years been gradually dying out, partly owing to the appropriation of their hunting grounds by planters and partly through mixing with the Sinhalese. They were formerly divided into clans or tribes, six of which, together with a few minor ones, were traced by Dr. Seligmann in his investigations in 1910. His book, entitled *The Veddhas*, contains the greatest number of collected facts about this race. They formerly kept themselves quite separate, inter-marrying with their own tribes, but not with the Sinhalese or Tamils. They are somewhat shorter than either of these two races, the average height of adults being about five feet or slightly less. They have broad, sturdy figures, narrow heads, and their colour is usually somewhat darker than that of the Sinhalese, though many of them are quite a yellowish brown, or even bronze. The Veddhas are usually regarded as hunting people who live in caves and move about in the forest. At present, however, only a very few of them live like this ; the majority have now become what are popularly known as village Veddhas. The latter live in settled villages, and either do chena cultivation (maize or kurrakkan) or look after cattle, either of their own or belonging to neighbouring Sinhalese. Their chief villages are Dambani, Malgoda, Elakotaliya, and Yakure near the right bank of the Maha-weli Ganga, north-east of Alutnuwara, and Nilgala to the east of Bibile. Practically all of them do a good deal of hunting, though the game is becoming more and more scarce. Some of the Veddhas hunt for half the year, living mainly on the animals they catch, on various roots and fruits, wild yams, monitor lizards, and wild honey. The habit of preserving meat by keeping it in honey in holes of trees is peculiar to this race. The Veddha villages are becoming more and more like those of the Sinhalese. As in nearly all hunting tribes, descent goes by the mother and not by the father, because she is the more permanent representative of the family ; the father may be absent for long periods, or meet his death while out at the hunt, and the mother will remain with the family and look after any dwelling or cultivation that they possess, women being regarded on terms of equality by the men. Similarly, it was always usual for the son to go with his wife's family, leaving his own, the relationship between father-in-law and son-in-law being particularly close. The conventional Sinhalese customs, however, are now gradually being adopted as they mix more with the Sinhalese. The true Veddhas have always been

described as quiet and peaceable people, noted for their truthfulness and sincerity, their habits of strict fairness in sharing everything they possess, their simple but sound morals, and cheerful but somewhat apathetic disposition. During the last century many of them have become demoralised, partly through the loss of their hunting grounds but mainly through being put on show to foreign visitors, who regard them as objects of curiosity, because they are among the most primitive peoples in the Indian area. They have been demoralised by being given gifts of money, in order to obtain which they have sacrificed their former truthfulness. They act to distinguished visitors the part that they think the visitors expect to see, though in their real life they may have even dropped the Veddha language and most of the old customs. The language has become greatly mixed with Sinhalese, and is now in danger of becoming lost. It is almost entirely a spoken language, and very limited in what it will express. There is no system of numbers, and very few words for expressing abstract ideas. The Veddhas have produced no important architecture, and have seldom remained in permanent dwellings.

They have preserved a very primitive form of religion which represents a stage through which most races have passed at some time during their early history. It is very valuable to study primitive religions, because it helps us to understand a great many of the things which we see in modern life. Religious ideas develop gradually, and most races pass through similar phases of development. Early beliefs and superstitions very often linger in the minds of people long after a higher form of religion has nominally been accepted, and exercise a very strong sub-conscious influence. Many people who have adopted the higher religions like Buddhism or Hinduism still retain certain beliefs which belonged to the primitive religion ; and many of the rites and ceremonies of these religions are based on practices which have been common since very early times. The early Sinhalese would inherit similar ideas from their ancestors on the mainland of India. The Veddhas have no religious literature, and the necessary knowledge for the practice of their rites was passed on by word of mouth by men who were the primitive representatives of the modern priesthood. Knowledge of hunting and other arts was similarly handed on by parents to their children. The principal feature of the old Veddha religion seems to have been a belief in the existence of spirits of the dead, who, after the death of the physical body, could either help or hinder the activities of the living. The spirits of outstanding individuals who had exercised any great influence on the history of the race particularly occupied their

attention. They were often supposed to reside in certain natural objects, such as rocks or hills ; for example one very important spirit, to whom they often addressed themselves, was called Kande Yakkha (=Hill Spirit), and was supposed to be the patron of hunting. It is possible that many of the modern religious shrines in Ceylon are located in places that were the reputed habitations of benevolent spirits, though their significance is now completely altered. Kataragama is probably an instance of this. Many of the Veddhas have grafted the idea of the Kataragam god, obtained from the primitive Hindus, on to their own beliefs. One of the most important of the religious ceremonies was the presentation of food, consisting of yams and water, or later, rice and coconut milk, to the spirits, either to propitiate them or for the purpose of getting aid in locating their game. The ceremony was led by trained men called Dugganawa, or later, Kapurale, who, during the course of the ceremony, would become possessed of the different spirits with whom they wished to communicate. These men are often called "shamans," and from this the religion is called "shamanism." The ceremony would be accompanied by symbolic devil-dancing, which is no doubt the forerunner of the modern Sinhalese devil-dancing. A communal meal was usually taken during the course of these ceremonies ; this is practised in a more highly developed form by the followers of nearly all the higher religions. The belief in spirits has always been very wide-spread in Ceylon, and with it is connected the belief in the so-called "evil eye," but at present it is very much confused with an idea taught by Buddhism, that the spirits of people who have in life been very strongly bound by earthly desires often hang around human habitations with malevolent intentions. The setting out of miniature meals for the spirits while people are ill, or on other important occasions, is no doubt a survival of the Veddha religion. The chief element in most primitive religions is fear, produced by the belief in superstitions. Most of the higher forms of religion are directed against this, and their teaching is intended to free the mind from such fear. In almost every aspect of life, however, it is possible to find survivals of primitive beliefs, and many of these are interesting and lend a very individual note to the culture of different nations. In Ceylon they are preserved a good deal in the ancient art, in such things as the figures and symbols used in religious processions, and in yantra and bali ceremonies.[1] Devil-dancing is, of course, not taken seriously by the educated people, but its distinctive character and its great historical interest make it worthy of preservation ; and this

[1] Yantra = preparation of charms ; bali = devil-dancing.

is true of many other ancient customs which the study of the Veddhas helps us considerably to understand. These people are now fast dying out and gradually losing their distinctive characteristics ; most of them know Sinhalese, and indeed it is becoming difficult to find a pure-blooded Veddha who lives in his natural condition and carries on his own rites and customs. If compulsory education is enforced in the Bintenne region, there will probably be very little sign of them as a separate race by the end of another century ; the race admixture has, however, already had a permanent influence on the physique of the people of this region.

The Dravidian people of the Dekkan had connection with Ceylon at a very early period, and would doubtless have possessed themselves of the island had it not been for the advent of the people who formed the Sinhalese race. The **Tamils**, who were the nearest Dravidian people on the mainland, constantly harassed the island during the early centuries of history, but only succeeded in establishing themselves permanently in the Jaffna Peninsula, which, on account of its infertility, was very little developed by the early Sinhalese. As time went on they gradually spread southwards into the Northern Province and along the east coast, where from half to three-quarters of the people are now Tamils. In older works on Ceylon the inhabitants in the north part of the island, apart from Jaffna, were often referred to as "Wanniyas." This term, meaning " dwellers in the wild country," is not a race name and would include quite a number of Veddhas, Jaffna Tamils who had migrated southwards, and remnants of the Sinhalese " Tank Civilisation."

The **Ceylon Tamil** has maintained practically all of the essential elements of Hindu culture which he brought from South India, though he has become sufficiently differentiated to be recognised as a distinct section of the Tamil race. In 1946 there were about 826,000 Ceylon Tamils, forming 12·3 per cent. of the total population. When the Tank country was well populated they were in closer contact with the Sinhalese ; but when the latter were driven to the south and west the dense jungles which grew up between the two races isolated them for several hundred years and their only contact was by sea, until the building of the Jaffna road and railway. " They have been in the country almost as long as the Sinhalese and, as we have seen, they have had their own kings. They came from many parts of the mainland including Chola (ancient name of Tanjore) and Pandya (which included the greater part of the modern Madura and Tinnevely districts). The Tamils occupied a prominent place even in the Sinhalese kingdom, especially from the seventh to the

eleventh centuries. They filled every office, including that of Prime Minister, and they decided the claims of competing candidates for the crown" (From *Ceylon*, by H. A. J. Hulugalle, Oxford Pamphlets). The Tamils are strongly tenacious of their own customs and even in recent years, when they have had quite a lot of intercourse with other nations, they have changed much less than the Sinhalese. They were allowed by the British Government to retain the legal customs connected with their religion, called Thesawalamai, because of their strong individuality. The contrast between the Tamil and the Sinhalese very well illustrates a problem which is often discussed in geographical works, namely, the relative importance of race and environment in determining the characteristics of people. There are many books which lead us to suppose that the physical conditions in any country determine most of the characteristics of peoples ; such works often under-estimate the very strong influence of hereditary race characteristics which cannot, as a rule, be explained away. The geographical conditions existing in Ceylon do not differ very widely in different parts of the island, and there are certainly many habits which are shared by both races. In physique they do not differ greatly ; their average height is about the same—they are taller than the Veddhas, but several inches shorter than the average European or the average African. Both races have a narrow skull, the Tamil's being slightly longer than that of the Sinhalese. We find, however, that though the geographical conditions are so similar, and though the physical characteristics of the two races are so much alike, their home life and customs are very different. Their dress, their food, their temperament, and their religion all possess a certain separate individuality, which appears to be due to an inherent tendency in the race rather than to the geographical conditions.

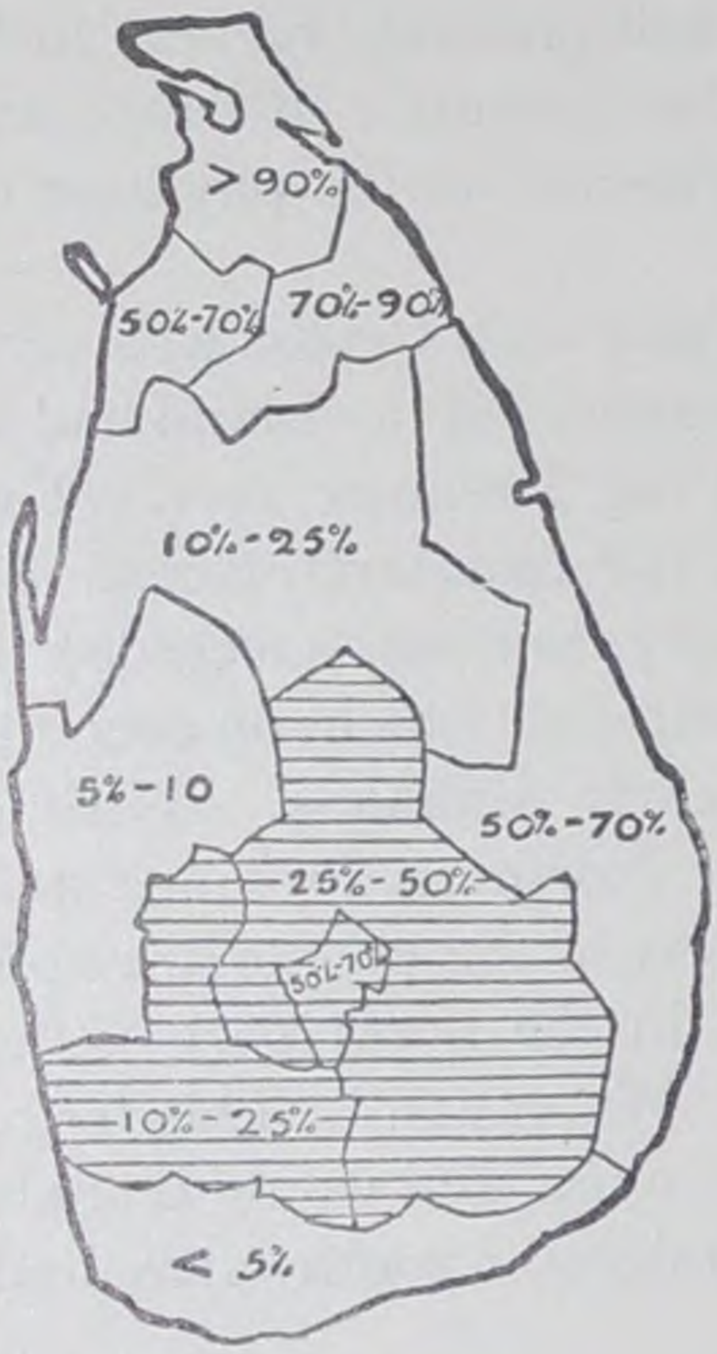

FIG. 80.

Percentage of Tamils in the different Districts according to the 1921 Census. In the North and East the majority are Ceylon Tamils. The shaded portion denotes areas where 95 per cent. of the Tamils are Indian (mainly immigrant labourers).

The Hindu culture and religion, based upon very ancient Indian classics like the Vedas and the Laws of Manu, which has for so many centuries had such a

strong hold upon millions of the people of India, is preserved by the Ceylon Tamils. They adhere particularly to what is called the Saivite cult, a special branch of Hinduism. They are much more conservative than the average Sinhalese, and have therefore largely resisted European influence in matters of dress, food, and home life. While submitting themselves to the educational influence of the missionary in the matter of intellectual advancement, they have seldom allowed this to enter into or interfere with their private home life, which is based upon the somewhat rigid rules of the Hindu culture and precludes many forms of social intercourse either with people of different castes or with foreigners ; they are especially exclusive in the matter of taking meals. As the Hindu religion in its highest form is monotheistic (=having one god), like Christianity, it was relatively easier for them to adopt Christianity than for Buddhists, who are non-theistic. The percentage of Tamil Christians has usually been slightly higher than that of the Sinhalese, the numbers in 1921 being 11·7 per cent. and 9 per cent. respectively. The number of converts has greatly decreased in recent years in both races. The rules of life prescribed by Hindu culture are very much more detailed than those of Buddhist culture, though as the latter arose out of the former they have much in common. The caste system was probably inherited by the Sinhalese from their Indian ancestors, but developed differently under the influence of Buddhism, which taught the equality of mankind and was essentially democratic. The Tamil caste system is based upon the old Indian system of division into rulers and educated people (Brahmins), warriors (Kshatriyas), farmers and merchants (Vaisyas), workers in trades (Sudras) ; and outside these groups the so-called "untouchables," who were out-castes because they were engaged in unclean occupations or had been expelled from the castes. A special characteristic of this system was the acknowledged superiority of the educated caste, or Brahmins, from which the priesthood was drawn. Amongst the Sinhalese this latter caste tended to disappear, because of the fact that Buddha had advocated that priests should be drawn from all castes, provided they were able to go through the requisite training. He also advocated another deviation from the Hindu scheme by ruling that priests should not be allowed to marry, and should renounce family life. Amongst the Sinhalese the caste system has usually been purely occupational, and the tendency has been to regard the castes as equal. This, however, has not always been observed in practice, as there has been from time to time a disposition for certain castes to assert themselves, and it is only in quite recent years that the idea of all individuals having equal rights

in the State has developed, probably through British influence. Considering the important part that the caste system has played in the social life of the Indian area, students of human geography should endeavour to understand its exact origin and function, especially as there is now the tendency to abolish it as a hard-and-fast system. A slight digression will here be made, therefore, for some necessary explanations relating to this important matter.

The Indian civilisation, one of the oldest and greatest that the world has produced, owes much of its stability to the care which its founders devoted to the framing of its social system. One of the most striking features is its definiteness ; something comparable with the caste system exists in many countries of the world, on account of the inequality in the natural endowment of different people, and yet it is only in the Indian area that it has crystallised out into such a definite form. As a matter of fact the feudal system in Europe is a very similar institution which, although formally abolished by different countries at various dates in their history, still continues to exert a very strong influence in all those countries. Both systems are based upon the idea of the inequality of human beings and on their necessary division for purposes of work and social intercourse. The tendency would be for the most educated classes to organise themselves into a superior sect for the control of government, religion, and other matters and also to take steps to protect themselves against the dirt and disease developing through the ignorance of the so-called lower classes. This seems to be a necessary stage in the development of most nations, and it tends to disappear with the spread of educational facilities to all classes. In England, though it was in the thirteenth century (1215) that a bill called the Great Charter, proclaiming the equality of men before the law, was given by the king to the English people, it was only in the latter part of the nineteenth century, when compulsory education had been enforced for some twenty-five years, that people really began to show by their actions that they believed in the equality of men ; and even to-day we do not find that people mix freely for purposes of social intercourse. There are many people who would be greatly affronted if invited to parties where they were expected to have meals with those whom they regard as inferior domestic servants ; while it is usual for people to marry into their own class and not, for example, for the daughter of an English duke to marry the son of a dock-labourer. Similarly, when people with clean habits come into contact with people of dirty habits, they will wash themselves and change their clothes in exactly the same way as

high-caste people in India have been in the habit of doing for several thousands of years. The chief difference between the two countries is in the fact that the thing has been more definite and formal in India than it has been in England, where people like to feel that they have liberty to follow their own inclinations. Hence it happens that people from other countries who criticise the caste system in India often actually believe and act upon many of the rules which it lays down. A person is in England just as likely to be outcast from his particular class of society by marrying into another class as an Indian is by marrying into the wrong caste. This is true in nearly all countries of the world, and more especially where there have been conquered races who have been relegated to an inferior position by the conquerors and made to do the so-called inferior forms of work ; so that caste rules are merely convenient social arrangements which are intended to secure a certain amount of stability in the community.

The Sanskrit word for "caste" means "*colour*," and the caste system is thought to have been developed by the Aryan people after they invaded the north of India ; the fairer Aryan people came to style themselves as the "high-castes," while the darker Dravidians and aborigines were called by them the "low-castes." Even now there are people in Ceylon who regard the fair skin as a mark of superiority. A comparable condition has been established in many countries conquered by Europeans, where the latter keep themselves quite apart from the native population. By degrees there was some fusion between the races, and the occupational caste system crystallised out ; but amongst both the Aryans and Dravidians there were a number of people at a much lower stage of civilisation than the rest, and these were made to do the more menial forms of labour and became the lower castes. By degrees the caste system became extremely complicated, with innumerable sub-divisions, very puzzling to foreigners who visited the country. One characteristic of the Indian system was the fact that people were expected to marry within their own caste. This had the effect of securing a certain number of people for definite types of labour, so that the caste system was a means of ensuring stability in a region where there were different races at different levels of civilisation, and it had definite economic advantages. The high-caste people protected themselves against the dirt and disease of the less developed people by rules relating to their entrance into houses, the pollution of food, and washing after contact, most of which were very sensible. The chief disadvantage of any hard-and-fast social system arises through the abuse of privileges, when unenlightened people forget the reason for rules and carry them out mechani-

cally, even when the reason for them has ceased to exist. This seems to be why people are now finding fault with the caste system and wish to have it abolished. The foreigners who criticise it adversely can easily collect instances of gross stupidity and cruelty shown by people who follow rules unintelligently.

One of the chief advantages of studying human geography is that we are taught to look at these big social problems from a wide perspective and to compare the social organisation of different countries, so that its effect on economic life and the development of civilisation can be estimated. The abolition of the caste system is a matter which is now agitating the minds of many people in the Indian area, owing to the fact that the spread of educational facilities outside the Brahmin caste has made people more equal intellectually ; but if the abandonment of such a fundamental human organisation is contemplated, people should understand its significance thoroughly and be able to build up a better system. The change must of course take place gradually. For reasons already explained the change is taking place more easily in Ceylon than in India, and the Sinhalese, who have always had more contact with the outer world, began to change earlier than the Ceylon Tamils ; but one difficulty consequent on this change is bound to occur, and is visible in Ceylon at the present moment. The higher castes have always cultivated book learning, and when unlimited educational opportunities are provided for the whole community, the tendency is for people to abandon what they consider to be inferior forms of labour in favour of book learning. This has already resulted in the overcrowding of certain fields of labour at the expense of others. The caste system exerted a useful check upon this. The condition, however, cannot remain permanent, for there must eventually come a phase when people with well trained minds will be obliged to devote their attention to the work which they regarded as menial, but will alter its character completely by devising better methods and labour-saving devices which will do the work quickly and still leave them leisure to carry on some intellectual pursuits.

The caste system is therefore to be regarded by the student of human geography as one of the most important social organisations that the world has ever produced, and one which has had such an extremely important influence upon all the human activities of the Indian area that no economic problems can be considered apart from it. Its study at the present moment in Ceylon is particularly important because such rapid changes are taking place, and in this island it has a particular interest because we have the old Indian system still preserved by a large number of the Ceylon Tamils, and a greatly

modified system amongst the Sinhalese, which is fast disappearing ; as in the case of the feudal system in Europe it will be a very long time before the effects of the caste system on almost all forms of human activity in Ceylon will be entirely eradicated. Modern human problems can only be thoroughly understood by seeing the present as a development of the past.

There are many other characteristics of Hindu culture which the Tamils have preserved which are worth detailed study and worth comparison with the customs belonging to other countries. Many of these long-standing institutions are now being severely criticised by the young people of Ceylon who have come into contact with other cultures. Criticism has been particularly directed towards the marriage customs, another very fundamental part of the human organisation. This has also received much attention from Europeans who have visited the Indian area. The two particular objects of criticism are the age of marriage and the arrangement of marriages by parents. In these two matters customs differ greatly in different countries. The general tendency, however, is for the age of marriage to go up with the development of educational advantages, and increased knowledge in its turn gives the desire for more individual freedom of choice. This has occurred in Ceylon in all the races, with the result that the age of marriage has risen very considerably during the last fifty years, exactly as it has done in Europe. There has always been more freedom amongst the Sinhalese than amongst the Tamils, largely owing to the influence of Buddhism, the Tamils tending to adhere somewhat rigidly to the Hindu code. It is not in the province of a geography book to do anything more than state the facts as they occur in the region concerned ; but it might here be pointed out that comparative studies show that the custom of marrying young people immediately upon attaining maturity has certain definite advantages and was evidently intended to guard against certain grave social evils which exist in many other countries. The problem offers scope for unlimited study and can only be rightly understood by looking squarely at the result of other systems. Probably no subject has been more thoroughly misunderstood by foreign critics than the marriage customs of the Indian area, except, perhaps, the subject of caste. Students in Ceylon have the opportunity of observing at least four different systems, the Tamil, Sinhalese, Muslim, and English, and it is very important to study them thoroughly before arriving at any conclusion as to improvements which might be made. Customs may vary yet be equally good in the long run, and different races appear to require different regulations.

The seclusion of women of the upper classes has also been practised by the Tamils much more rigidly than by the Sinhalese ; it has for many centuries been a feature of Hindu social life. It was impossible amongst the lower classes, where the women have always been obliged to do all sorts of outdoor labour or to enter domestic service. This is another practice which it is only possible to understand through a comparative study of life in different regions. As a rule it has been most common in the countries where law and order were insecure or where foreign invasions were common. It has been a sheer necessity amongst desert Arabs, who even now are always open to raids —hence the Muslim regulations. According to tradition it was not practised by the ancient Indians, nor by the ancient Sinhalese, but it was probably developed as a necessary protection against the ravages of foreign invaders. Even at the present day, in countries which call themselves highly civilised, outrages upon women are very common during wars. The practice no doubt became more and more common during the numerous invasions to which both India and Ceylon have been subject, very much to the detriment of the mental development of women. The importance of maintaining peace and adequate safeguards to law and order can be vividly realised by those who reflect upon the difference it would have made to the home life in the Indian area if the women of the educated classes could have been as well educated as their men folk. The modern tendency is to abolish all such precautions, but those who have the opportunity of studying the terrible effects of modern warfare or the results of foreign invasions cannot fail to see that precautions are still necessary, and that in the long run it is wiser to err on the side of caution in these matters. In many of the vital affairs of life the Tamils have remained more conservative, and have preserved more of their old customs, so that their mode of life is more distinctive than the Sinhalese, who are on the whole more adaptable.

The details of Hindu culture are preserved in a number of very ancient classical works, and the Hindu religion is similarly preserved. This religion is much older than Buddhism and was not founded by any one religious teacher, but represents a gradual growth, to which a number of inspired teachers contributed their quota as the years passed by. It appears to have been pantheistic (=literally, "God in everything") at the beginning and gradually developed into its later monotheistic (=literally, "one God") form. The Hindu religious teachers have contributed very largely to the development of abstract thought in morals, philosophy, and theology, in all of which branches

a very high level has been reached ; but as with all religions, in the hands of imperfect beings, the practice of Hinduism has undergone periods of degeneration. In these periods people revert to superstitions surviving from primitive religions and lose their zeal for the understanding of the more abstract moral teaching. It was in such a period, during the sixth century B.C., that Prince Gautama founded Buddhism. As he found the people so steeped in superstition he advocated the abandonment of belief in any form of god, and impressed upon them the necessity of freeing their minds completely from the shackles of material things and divesting themselves of every suggestion of gross superstition. As we see, however, the majority of people find it very difficult to get rid of primitive notions originating in earlier religions which have so long held sway in the mind of man. At the present moment quite a large number of these primitive superstitions are to be found amongst the adherents of both religions, so that foreigners often get a very perverted impression of their significance. Outside of the Indian area it is quite a common notion that Hinduism is polytheistic (=literally, " many gods "). The large tower covered with traditional figures depicting scenes from the Puranas (religious literature) which is characteristic of the Hindu temple, or Kovil, is taken to be a representation of a collection of different gods. This impression is further deepened when they observe the Hindu custom of expressing the aspects of the deity under many different names and using different symbols to express them. On the whole it is a very difficult religion for foreigners to understand.

The temples used for both religions are characteristic features of Ceylon landscapes, and each of them expresses symbolically many of the abstract ideas belonging to the religion. The symbolic expression of religious ideas has always been well developed in the Indian area. The original Christian churches were also strongly influenced by this Eastern symbolism, which is in Ceylon an essential part of life. Later developments in Christianity have tended to eliminate it, as we can see by contrasting the early buildings with some of the Protestant churches, where the building means practically nothing and is made as simple as possible. There are, of course, many outward differences between the two religions which affect the framework of social life. Perhaps the most obvious of these is that in Buddhism the priesthood is drawn from all classes and is under the vow of poverty, but in Hinduism it is confined to the Brahmin caste ; also that the devotions of Hindus are mainly carried out through the medium of the priesthood, while Buddhist devotions are performed independently, with the assistance of the priesthood if desired.

These two religions have had a most important influence on the development of the social framework of Ceylon, and have affected almost every aspect of life. The Tamils, for instance, are forbidden by their religion to eat meat, though in practice they often only abstain from beef and pork; Buddhists are chiefly instructed not to kill, but can eat the meat killed by other people. Hence it arises that a large proportion of Tamils are vegetarians—a much greater proportion than amongst the Sinhalese. Other differences in food spring largely from the resources of the areas inhabited by the respective races. The palmyra is used more than the coconut in the Tamil area, while the Tamils rarely use jak or breadfruit. The brinjal (kaththarikai) is the most popular vegetable, while ghee and gingelly oil (nalla annai) replace the coconut oil of the Sinhalese in cooking. In the various sweets and cakes we see reflected not so much the geographical conditions as the tastes of different races. For instance, the most characteristic cake of the Tamils, called vadai, a small, round, flat cake with a hole in the middle, which is fried in ghee, is rarely made by the Sinhalese.

In dress the particular taste of the different races is also evident. It is impossible to explain why the Tamil women always wear a saree and never wear the short cloth which is the ordinary home dress of the Sinhalese. Similarly, it is not easy to see why Tamils usually prefer to wear a turban, while the Sinhalese wear no headdress at all. The Tamils being more conservative have been less influenced by European fashions in dress than the Sinhalese, a much smaller proportion having adopted European dress. This may, however, be connected with the possibilities relating to Government posts in the respective areas.

The Ceylon Tamils are remarkable for their great thrift and industry, which is possibly connected with their geographical setting. The Jaffna Peninsula contains one of the most remarkable human settlements in the world. The Tamils have maintained their existence in an exceedingly poor area by means of great frugality and patient hard labour; they expect little leisure and supply many of their wants from the land by intensive methods which call for minute unremitting personal attention, such as hand watering. This is supplemented by fishing, and trading with the mainland of India, especially in tobacco. The brass vessels used instead of china ware by the richer people are very characteristic. Aluminium is, however, now replacing brass, owing to the enterprise of German traders, who can produce the same type of vessel as the brass ware of Madras in aluminium at about a quarter the cost.

The Jaffna Tamil is a master in the art of the reduction of his material wants, and when he has leisure to allow for intellectual study he applies himself to brain work with the same patience and industry and the same bold simplicity which characterises his manual work ; he expects no more leisure as a student than as a manual labourer, and is capable of exceptionally long periods of mental exertion. There is also a strong individuality in his work, and the Tamils have undoubtedly made a most valuable contribution to the culture of Ceylon. When we contrast the characteristics of the Tamils with those of the Sinhalese it is quite evident that though some of their characteristics are inherent in the race, many of them are due to the different mode of life which the land on which they have settled imposes upon them.

The inflow of Tamils into Ceylon still continues, though it was arrested for a long time during the European invasions. In olden times people of all types came over with the Tamil kings during the various invasions ; at the present time the immigration is mainly confined to poor agricultural labourers who come to work on the British plantations, and the **Tamil tea labourer** with his " blanket " on his head is now a settled feature of the hill country. The Sinhalese, who had already a highly developed agricultural system, showed little inclination to become servants of the new British landowners, except for undertaking certain types of highly skilled responsible work. The average Sinhalese, however poor, was a landowner, and as a rule self-supporting, and it was outside the normal scheme of things to hire himself out for the lower forms of agricultural labour. The British planter, therefore, had to look elsewhere for the large supply of low-grade workers which he required for such purposes as clearing the land or picking and weeding tea. The southern portion of the Dekkan had long been over-populated and emigration became increasingly necessary during the nineteenth century, especially in years when a partial failure of the monsoon rains resulted in a poor harvest. These emigrants, many of whom were quite destitute, were glad to take regular work anywhere, so long as they could be fed ; and as there was a great demand for agricultural labourers in all the tropical European colonies, they were easily recruited by representatives of firms in these colonies, under a system which was called " Indentured Labour." By this scheme they had to sign long-period contracts to remain in the place to which they agreed to go on condition of free transport. On arrival at their destination, though materially better off, they found themselves politically reduced almost to the status of slaves, because they were not expected to claim any political rights nor to become owners of land.

As they were people whose ancestors had been landowners, some of them naturally looked forward to saving enough money to buy a small piece of land and settle on it, while many hoped to return to their native land with a little money saved to start afresh, if they should hear that conditions had improved. Their pay, however, was so small that even when the contract was ended they found it almost impossible to return home even for a short period, so that in the more distant colonies, such as the West Indies, the Pacific Islands, or the South African States like Natal, this system created a great deal of discontent. Finally the Emigration Act of 1922 put a stop to many abuses. Ceylon and Malaya being much nearer, received a large proportion of these emigrants. In these two regions they did not encounter quite so many difficulties, because the conditions were more similar to those at home. To Ceylon they could go on a monthly contract, subject to renewal each month ; it was also easier to take families.

There are great difficulties on the side of both employer and employed in connection with this type of labour, many of which will probably never be overcome. The employer, quite naturally, wishes to have his work done efficiently and regularly, but as his social life is quite separate from that of his labourers, and he hopes to return to his native land when he has made sufficient money, he has not always much sympathy with the political aspirations or the customs of his workers. It must be said, however, that though the British planters have often lacked this sympathy, they have as a rule treated the Tamil labourers well in a material way. They have tried to house them in sanitary dwellings, and often provided them with schools and medical attention, as well as guaranteeing a permanent wage. The immigrant labourers represent a class of exceedingly poor people who were formerly wholly illiterate, quite ignorant of the conditions obtaining in the country to which they were going, and often, under the old system, deceived by foreign agents who promised them highly-paid work and improved conditions. On arrival at his destination, the labourer was often disillusioned, perhaps his health broke down, or he found it impossible to adapt himself to the new mode of life ; quite often, therefore, the contract was broken, and the labourer disappeared, even though his travelling expenses had been paid by the planter, or perhaps even an advance of wages had been made. It was a penal offence for a labourer to break his contract of service ; if he went to work on another estate his indebtedness was transferred there. He thus found himself as much embarrassed by financial difficulties as he had been at home, where the failure of his crops had obliged

him to mortgage his land. It must be remembered, however, that these people had long been obliged to live very near the starvation limit, and had never been able to accumulate any surplus wealth to provide for bad seasons or for education. Being extremely ignorant, they were often unable to understand all the many problems connected with the Government control of their movements and their moral indebtedness to their employer.

In addition to estate work, many immigrant Tamils are employed by the Public Works Department as unskilled labourers on roads, railways, and other public services. These as a rule receive actually more in money payment, but they are not supplied with rice as the estate workers are. In 1946 there were 682,000 Indian Tamils in Ceylon. They constituted 10·2 per cent. of the total population. 80 per cent. of the estate labour is done by Indian Tamils. They are to be found mainly in the Central Province, which has the greatest number of British-owned estates. As conditions have improved, many more are settling permanently in the island. Like the Ceylon Tamils, they regulate their lives by the rules of Hindu culture, though most of them are at a very much lower level, and being ignorant, they are frequently superstitious, and their religious ideas are often very primitive. Their entrance has caused the development of two new types of settlement, "the labour lines" of the hill estates, and the "P.W.D. settlements" along the main roads. As the immigrant Indian Tamil comes most into contact with the European, he is often represented in popular European periodicals as the "native of Ceylon." Consequently many people have an erroneous idea of the real Ceylonese.

A completely separate and very interesting small community of Tamil immigrants is formed by the **rickshaw pullers**, who are mainly in Colombo. These remarkable men are as a rule of a much higher type than the estate labourer. They are usually literate, sometimes remarkably well read, and are frequently to be seen reading classics while waiting for a run. They often own small farms on the mainland, to which they return after a few years of this exacting form of labour, for which they must be trained from earliest youth. They are usually men of remarkably good physique, and quite often are able to speak a little English and Sinhalese. They either hire themselves to owners of rickshaws or run their own rickshaw independently for hire. Being of the Tamil community, and therefore Hindu by religion, they usually refuse to live in the houses of Sinhalese, and must be supplied with a separate hut where they cook their own food. They often live on a remarkably abstemious diet, taking

little else besides rice. They frequently manage to save a good deal, and finally return to their families in India with money which will help to pay for the education of their children.

The Tamils, as we have seen, are representatives of a group of races called the Dravidians, who inhabited the Dekkan at an early stage in its history, and who probably extended also into the north of India until they were driven out by the Aryan people who came in from Central Asia through the north-west frontier. The Aryans had a much fairer skin, were on the whole taller, and brought with them the Sanskrit language, which has greatly influenced Sinhalese and most of the other languages of the Indian area. They were fully established in the north of India by about 1000 B.C., and no doubt became modified by mixing with the Dravidians, so that to-day there are many intermediate types between the short, chocolate-coloured Dravidian like the pure-bred Tamil, and the tall, fair-skinned Aryan of the Punjab. Both the Aryan and Dravidian belong to the narrow-skulled, wavy-haired section of the human stock, which includes nearly all the European races. The people who form the Sinhalese race are supposed to have come from the south side of the Ganges Basin, and were probably one of these intermediate types. They are thought to be the descendants of Vijaya, the exiled prince, who, according to legendary history, left his own country during the sixth century B.C., landed in the north-west of Ceylon somewhere near Mannar, and succeeded in routing the aboriginal inhabitants. It is popularly supposed that the original **Sinhalese** were very much taller than the present race. This, however, is not very probable. They certainly may have become somewhat modified in their new surroundings, but races do not as a rule alter their essential characteristics to such a great extent when they move to a fresh environment. It is perhaps possible that they became somewhat darker in colour. The Sinhalese have been so much in contact with other nations that they have, like the English and certain other island people, received the infusion of other racial elements. It is not uncommon, however, to find exceedingly fair Aryan types in families which are not known to have any European admixture. They did, of course, intermarry with the aborigines, who were of a much darker type, at the beginning, and hence we have a great range of different shades of brown represented in the Sinhalese people. "They are a mixed race, the resultant of several waves of immigration, with much Tamil blood in their veins. From very early times they have had a distinct language which was at first an Aryan dialect written in the Brahmi script. The vocabulary has been enriched with Sanskrit and Pal

words, and Tamil influence is reflected not only in the vocabulary but also in the structure of the language" (from *Ceylon*, by H. A. J. Hulugalle, Oxford Pamphlets).

In 1946 the total number of Sinhalese in Ceylon was 4,637,000, and they constituted 69 per cent. of the total inhabitants. They are divided into sections called the Low-Country Sinhalese and the Up-Country or Kandyan Sinhalese. This division is, no doubt, the result of the physical division of the country into two parts. Mountain people usually become differentiated from the people of neighbouring plains. They are isolated and have much less contact with other peoples and tend to become conservative and independent. They form naturally into separate clans or units isolated by mountain ridges. Life is generally more difficult than on the plains, though the air is more bracing; they tend to become hardy and virile and do not take life so easily as their richer neighbours on the plains. The inhabitants of Low-Country were easily conquered, but the Kandyans put up a sturdy resistance for a long period and in spite of final conquest they refused to give up their ancient customs and bargained with the invaders for the retention of their own code of laws.[1] Though the modern roads and railways have destroyed the former isolation of the Kandyans, they remain a distinctive community and form the most conservative element amongst the Sinhalese. They have been less susceptible to European influence, and have intermarried with other races much less, particularly in the upper classes. One of the most interesting relics of mediæval times preserved by the Kandyans is the old ceremonial dress of the Rata Mahatmayas.

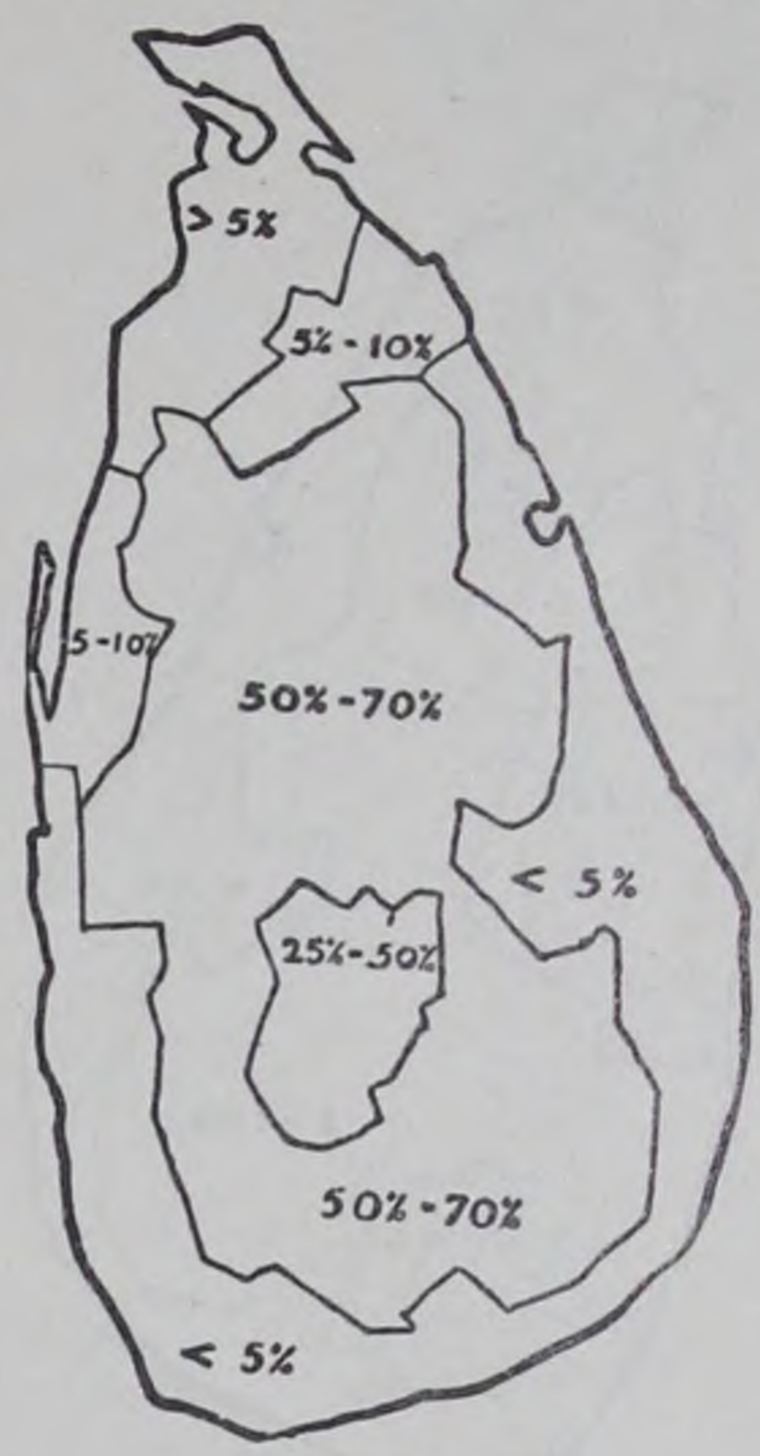

FIG. 81.

Percentage of Kandyan or Up-Country Sinhalese in the different Districts according to the 1921 Census.

It will be seen from the map showing the distribution of races that the **Kandyan Sinhalese** have spread outside the limits of the hill country proper,

[1] It must be remembered that a large proportion of the Kandyans were former Low-Country people, who had fled from the "tank country" owing to Tamil invasions.

mainly into the uplands of the North Central Province. Though they have spread out a good deal their rate of increase is not as great at the present day as that of the Low-Country Sinhalese.

The **Low-Country Sinhalese** inhabit the most densely populated and the richest part of Ceylon in the western and southern provinces. They form the section of the population which has been most open to foreign influence, and most strongly modified ; so much so that many of them have adopted not only the clothing but also the mode of life of Europeans, this section being mainly confined to Colombo. They are much less conservative and much more adaptable than their neighbours in the hills, and have therefore been subject to somewhat rapid changes during the last century. Their rate of increase in recent years has been very rapid and exceeds that of any other section of the population.

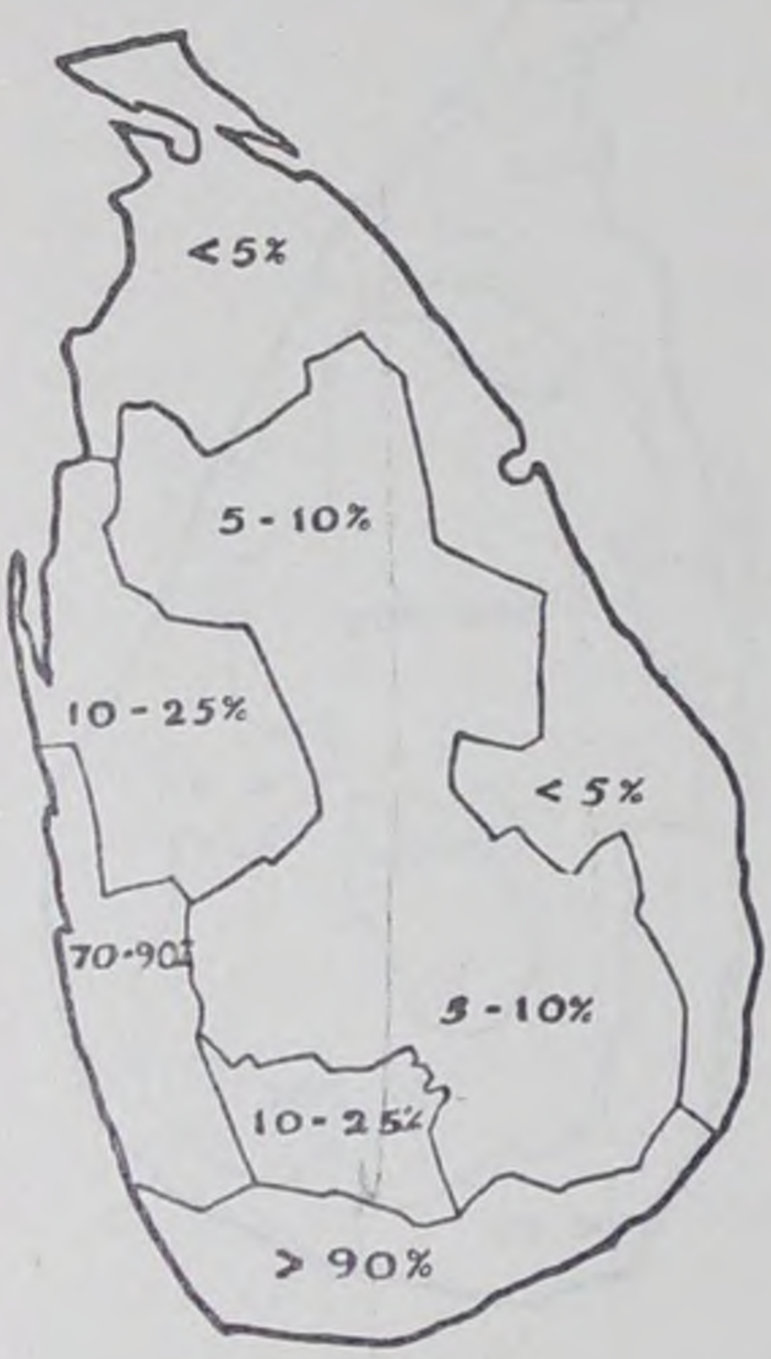

FIG. 82.

Percentage of Low-Country Sinhalese in the different Districts according to the 1921 Census.

The Sinhalese people originated in India and hence the basis of their culture is essentially Indian. They have, however, become greatly differentiated and have developed a mode of life and form of culture which is quite distinctive. This differentiation is probably due to a number of different causes, the chief of which are as follows :

(*a*) Complete change of geographical setting.

(*b*) Contact, through traders and invaders, with other cultures.

(*c*) Preservation of Buddhism in its purest form after the mainland peoples had reverted to Hinduism or been converted to the Muslim faith, and intercourse with Buddhists in other countries.

Change of geographical setting has caused some alterations in the mode of life of the Sinhalese, though as paddy cultivation was also the basis of life in their country of origin, many habits connected with work and home life are similar to those of the Indians.

Constant intercourse with foreigners has made the Sinhalese more adaptable and more cosmopolitan and the freedom of thought encouraged by Buddhism

has also contributed to this effect. Buddhism in its purest form is probably the most tolerant and the most free of all the great world religions. As it is not antagonistic to Hinduism, but grew out of it, the form of culture which has developed has many Hindu elements. The art and literature of the Sinhalese has much in common with that of the Tamils ; *e.g.* Saivite ideas are often found expressed in the art of Buddhist temples (see Fig. 83).

Reference has already been made to the modified caste system developed by the Sinhalese. It was purely occupational and never so rigid as in India. The out-caste class was never so numerous and rules relating to "untouchables" were not observed. The chief out-castes at present are the Rodiyas, the supposed descendants of high-caste people who were turned out of their caste long ago and must now beg for their living. Education more than anything tends to destroy caste differences, and in Ceylon the caste system is now rapidly breaking up. It is, however, so closely interwoven into the habits and culture of the Sinhalese that it will probably be an important influence long after it has been formally renounced, exactly as the feudal system has continued to affect Europe. Students of human and economic geography should study the caste system of the Sinhalese very carefully.

FIG. 83.

Wall Paintings at Aluwihare, showing Saivite and other ideas in the decoration of a Buddhist Temple. Unfortunately, these quaint pictures have recently been obliterated, as the walls have been re-painted.

The position of women is also very different amongst the Sinhalese. The characteristic house is "open" in form, garden boundaries are mere marks and often in disrepair and the modern women have an air of freedom not noticeable

in Tamil communities. The purdah system has never been rigorously carried out amongst the Sinhalese, though seclusion of women has been necessary at several periods in history owing to the incessant warfare. In this matter, however, as well as in the caste system, the British have probably exerted a strong influence in the direction of personal freedom ; the personal security under British rule in later years has also made conditions much easier. Educational facilities for women have been delayed largely for economic reasons. There never seems to have existed any opposition to women's education on the part of the Sinhalese—in fact it has everywhere been received with the greatest enthusiasm and in later years is in great demand by the super-educated men who have been abroad for their education and do not care to have ignorant wives. In spite of the lack of schooling the Sinhalese women have a remarkable amount of astuteness and insight as well as innate culture, due not only to their increased personal freedom but also no doubt to the cultural influence of Buddhism. They have not yet entered much into business or the professions ; but it is interesting to note that in the new constitution they are granted the same political rights as men and there appears to have been no opposition to this on the part of their men folk—it was granted almost for the mere asking. (English women had to fight for this right for over fifty years and were met with every possible opposition ; they only obtained the vote on the same terms as men about the same time as it was granted to the Ceylonese.) Sinhalese women are naturally more timid than the English and not at present very fond of public life ; they are great home-lovers.

Reference has already been made to the foreign influences on Sinhalese dress. It has become more and more cosmopolitan in later years, though the recent Nationalist Movement has caused the revival of interest in national dress. The "cloth" is almost the only truly Sinhalese article of dress and until recently it had almost disappeared from public life. Other interesting features, like the large tortoiseshell comb worn in the hair of men, are fast disappearing. Many articles of jewellery, especially charm cases and betel boxes, have remained distinctive. The absence of head-dress amongst the Sinhalese is remarkable.

Sinhalese food is to a certain extent distinctive. Rice, the chief staple food, is not peculiar to Ceylon. Very few people in the island do not use it as their chief food. Only a few chena cultivators use kurakkan, a small brown-seeded millet, instead of rice, and a limited number of people in the Talawa country use maize. The use of wheat bread and biscuits is somewhat on the increase now

in towns ; these commodities are useful as they are more easily portable than boiled rice. The coconut ranks next in importance to rice as a Sinhalese food ; especially typical is the use of coconut oil instead of animal fat for cooking and of coconut " milk," made by soaking the grated nut in water. The method of preparing curries including this oil and " milk " and fresh chillies differs from the method employed in India. The plantain, jak fruit, breadfruit, yam and lime are all very distinctive features of Sinhalese food. People use

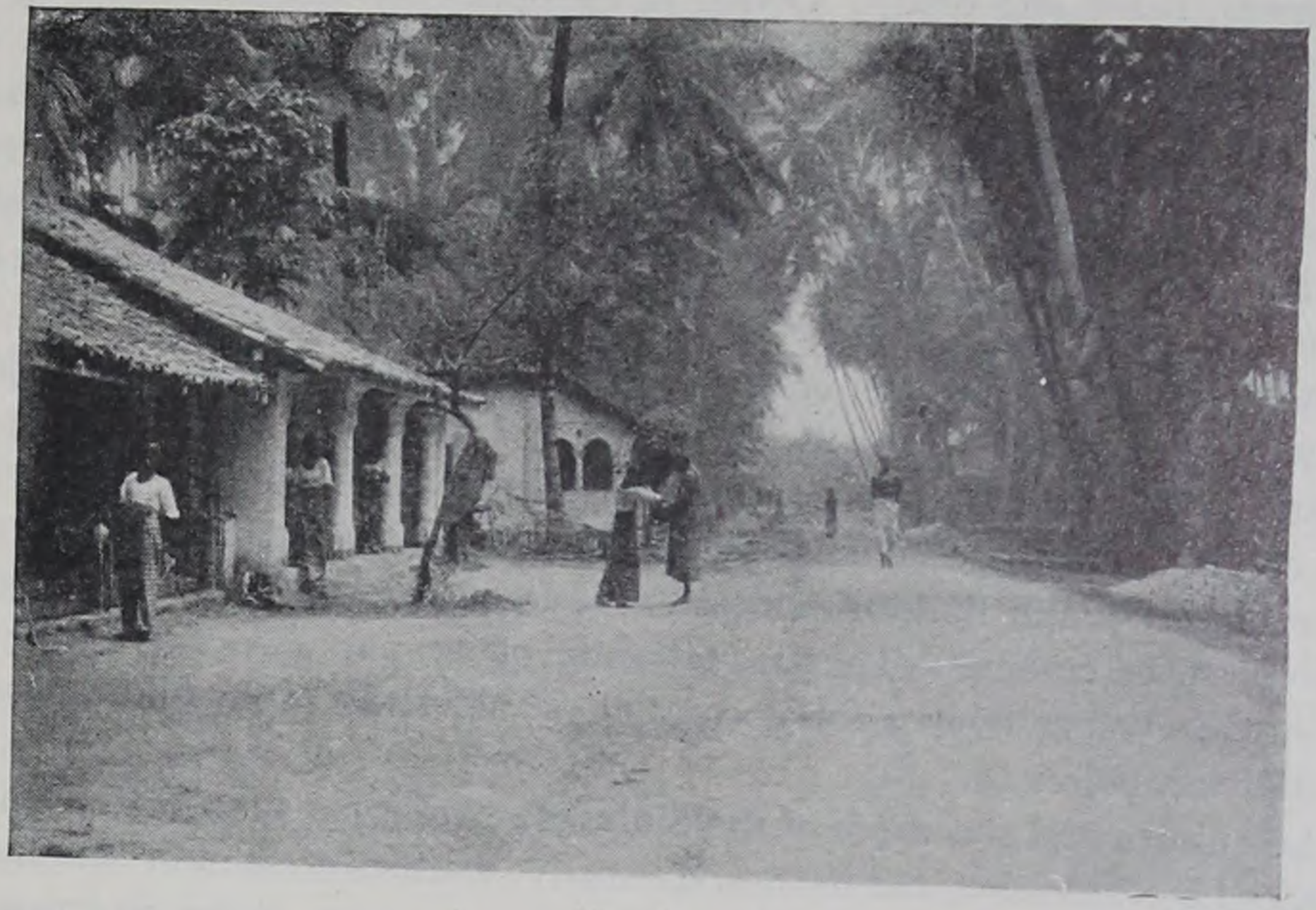

FIG. 84.

Buddhist Priest collecting Food. This was evidently a familiar sight when Fa-hsien visited the island over fifteen centuries ago. Note form of houses, papaw tree on left, and Colombo-Galle Road.

a relatively small quantity of meat in their diet ; fish is more important, especially in places not far from the sea, though the peculiar form of dried fish imported from the Maldive islands is one of the most characteristic foods everywhere.

Reference has already been made to the control on meat-eating exerted by Buddhism. This is a wise recommendation, as indeed are most of the important rules of the great religions, especially in the particular country in which they originated. Meat fat is the most heating type of food and is very useful in places where the air temperature is always much lower than that of the body.

The Eskimos, who feed very largely upon meat, live in an atmosphere that can be anything up to 150° F. below the normal temperature of the body (98·4° F.). In Ceylon the atmosphere is seldom more than 20° F. below the temperature of the body, and water for bathing is seldom below this level. It is therefore better for the inhabitant of Ceylon to eat a small proportion of meat and to take the protein which is present in lean meat and very necessary for the building up of tissues, from other foods more free from fats—such as eggs, fish, nuts, and pulse foods (peas, beans and dhal). Owing to European influence meat-eating has somewhat increased, but it is not beneficial in a hot climate. Incidentally it is of all foods the most difficult to keep good and to maintain in a clean condition. Milk is another food used sparingly by the Sinhalese owing to the difficulty of keeping animals and of keeping it clean. The suggested abstention from alcoholic drinks in Buddhism as well as Hinduism is also a wise piece of advice in a hot country.

The areca palm and betel creeper are characteristic of the Sinhalese parts of Ceylon. Their use to supply the nuts and leaves for "betel-chewing" is very ancient, and these plants enter into all sorts of ancient customs, especially those connected with ceremonial gifts. The coconut is similarly an essential feature of Hindu and Buddhist culture as it enters into nearly all the religious and domestic ceremonies. The type of pandal of coconut leaves and the method of using the young flowers for decoration would strike a foreigner as being essentially Sinhalese.

The culture and social life of the Sinhalese nation has been fundamentally influenced by Buddhism and its most distinctive features are almost entirely due to the development of this religion. About 92 per cent. of the Sinhalese are Buddhists and 8 per cent. are Christians. The proportion of Christians appears to have considerably decreased during recent years; as, however, there was a long period when it was materially worth while to profess Christianity, census figures of last century are not wholly reliable. The rapidity with which Buddhism spread through the whole of central and south-east Asia from the fifth century B.C. to about the eighth century A.D. and affected the life and thought of more than half the population of the world by the force of its own intrinsic value and not by missionary propaganda is one of the most remarkable occurrences in world history. The Tri-Pitaka, written down in Ceylon, has probably influenced more people than any other literary work in the world. Though it gradually died out as a formal religion in India between the eighth and the twelfth centuries A.D., and in other countries became so modified as to

be almost unrecognisable, it left a mark upon the social life of all the countries it affected which has never been effaced ; it was probably, also, the most powerful influence in the direction of peace and kindliness that the world has ever experienced. In Ceylon Buddhism was preserved in its purest form, and though it suffered degeneration during the European invasions, the twentieth century has seen a remarkable revival. This is making itself felt by the revitalising of private life and by the direction of attention to the importance of study. The growth of Buddhist schools during the twentieth century is probably one of the most noteworthy events in the history of the Sinhalese race and will no doubt have a great effect on future social and economic development. Through Buddhism the Sinhalese have come into contact with great thinkers all over Asia, and indeed, in recent years, all over the world. At present many relics of the degenerate period still await the attention of reformers, but progress is being made.

A Buddhist community, by reason of its beliefs and the advice upon living given in its great classical works, develops a distinctive character which marks it off clearly from other communities. The most fundamental characteristic is the custom of maintaining an Order of Priests, which anyone may join, and which is intended to assist the spiritual development of its members quite apart from any service they may render to the community at large.

The priesthood is vowed to poverty, and the rest of the community undertake to supply their material wants in order that they may lead the spiritual life ; special respect is paid to anyone who is performing religious exercises, the more so if he decide to enter the " Order." No other community in the world maintains such a large number of priests, nor is the custom of " begging " for material wants as carried out by the Buddhist priests, maintained in any non-Buddhist community. Great prominence is therefore given to the religious life. Mutually helpful arrangements are made for people performing religious duties—*e.g.* for those on pilgrimage ; and this is considered as a necessary duty in life. The Buddhist is taught to do kindly things in order to acquire " merit " which will add to his spiritual advancement ; hence there is a remarkable voluntary national service for pilgrims though it is almost entirely without central organisation. The series of " ambalams " for the free use of pilgrims, provision of water pots and free meals is quite distinctive in the Indian area. Buddhism made a very definite attempt to get people to place spiritual development first in life and to reduce their physical and material wants to a minimum. For that reason the peoples who are commercially minded have called it a

religion of stagnation ; it tends to make people live simply and not to " progress " according to " Western " ideals.

When the average European or American is told about the arrangements for pilgrims in Ceylon and India he usually asks whether a pilgrim has to show up

FIG. 85.

A typical Ambalam for Pilgrims and other Travellers, provided by a philanthropic Buddhist. Drinking water is kept in the pot under the tree by the neighbouring villagers. Note fine design of the clay pot which is made by village potters.

a ticket before he is given a free meal or a night's lodging ! This possibly suggests the difference between the respective communities—commercially-minded people cannot understand the particular type of giving which is practised in Buddhist and Hindu communities. They also regard it as most unsatisfactory if people wish to leave their regular work and go on pilgrimage ; the English planter thinks it is a nuisance, while it is accepted without question

by the Sinhalese. It must be added, however, that Hindus and Muslims also recognise this last privilege.[1]

The outlook of a Buddhist community has been aptly explained for the benefit of Westerners by a Tibetan lady, Rin Chen Lha Mo in a book called, *We Tibetans*. "We are from your point of view an unworldly people. Our religion enjoins it, and our priesthood sets the example. We do not consider it right to struggle for material things, even to have things that our neighbours cannot have. . . . We have not your incessant struggle and stress and strain, your race after wealth and your fear of poverty. . . . Civilisation is not bound up with material things. A civilised people must have a sufficiency of them, and that is all. We have it. You have more than it. You have a great many things we have not. Wonderful things. . . . I am never tired of looking at your machines. You are indeed a wonderful people to have produced all this wealth of material culture. . . . But there is another aspect of the matter. People can do without these things, but if they are there everybody naturally wants them and life becomes very expensive. . . . Few can obtain the luxuries, but all want them. Wealth means that you may have them, poverty that you may not ; if you have them you are respected by everybody, if you have not you are thought of little consequence. So wealth becomes the goal of endeavour, and men's minds are taken off other things we consider more important. And some people in their struggle for wealth or fear of poverty set aside the principles of right living, even of humanity, sacrificing their souls to this strange god whom we have not. . . . I look upon your material culture like this. The things are very desirable in themselves and the spirit that produced them is beyond praise, but people should not misuse them nor struggle for them. The more desirable they are the greater the merit in renouncing them. Perhaps they are just there to be renounced. No, it can hardly be that, but they are certainly not to be misused. . . . You are rightly proud of your material culture, but you must not think peoples without it are necessarily uncivilised. Civilisation and material culture are not one and the same. Your peasants have but few of the things your townsmen enjoy and yet they are no less civilised, they might indeed be more. It is a question of spiritual outlook."

It could not be said that this ideal has ever been attained in Ceylon, but this remarkable woman has expressed the ideals which permeate a Buddhist com-

[1] It should be noted that many customs relating to religion are broadly similar over the whole Indian area, but the detailed practices differ in different regions. Thus Muslims and Hindus may have parallel arrangements, though the Sinhalese practices will be quite individual.

munity and which tend to make it rather non-commercial, kindly and quiet. European influence in the opposite direction has played its part in later years so that the present condition is somewhat complex. No study of human and economic geography in Ceylon can be complete without taking into consideration the Buddhist influence upon social life. Though the caste system has tended to generate a belief in human inequality Buddhism has always pulled the other way in the direction of democracy and communal life. It is probably seen at its best in the smaller Sinhalese villages, where life is simple and quiet and the people are refined in mind though they have little book-learning apart from the Buddhist scriptures.

The ordinary rules of life relating to birth, death, marriage, and family duties are all clearly set out in Buddhist literature, and these form the basis of social life amongst the Sinhalese. As will be seen later, Christian literature is more vague on this subject and forms and ceremonies differ greatly in Christian communities. Amongst the British the tendency has been in recent years to abandon forms and ceremonies in family life and this influence has spread a little in the educated classes in Ceylon. Thus the ancient Sinhalese marriage ceremony in which the thumbs of the bride and bridegroom are tied together and water poured over them, is now seldom observed. Possibly, however, the old regulation, now abolished, that marriages were not to be considered legal unless solemnised in a Christian Church caused many of the older customs to die out.

Family ties have always been very strong in the Sinhalese community. In this respect, however, they are not greatly different from most of the Indian races. The special rules relating to "binna" and "deega" marriages are similar in type, though not in detail, to those of many Indian races. Probably owing to British influence it is now becoming more common for newly married couples to live in a house apart from their parents ; this is also, no doubt, due to the rise in age of marriage in recent years. The communal family households are not usually as large in Ceylon as in some parts of India. The use of horoscopes and their comparison for purposes of marriage is also not peculiar to Ceylon ; astrology is, on the whole, much more used at the present day in Asia than in Europe. Propitious times and dates for events as determined by astrologers are not held in respect by most Europeans as they are by many Ceylonese.

The people who are called Moors in Ceylon are partly of Arab descent, and the reason for their settlement has already been explained in the chapter on

Historical Geography. In 1946 they numbered 455,000, and constituted nearly 7 per cent. of the population. They have become considerably modified and are as a rule somewhat darker than the Arabs, and slighter in build. Their average height is greater than that of the Sinhalese and they retain much of the muscular power and endurance of the Arabs, as well as somewhat Semitic features. In a school they can be recognised, not only by their habit of always wearing a fez, but because they are so often taller than the Sinhalese or Tamils. They are divided into two groups, the Ceylon Moors and the Indian Moors.

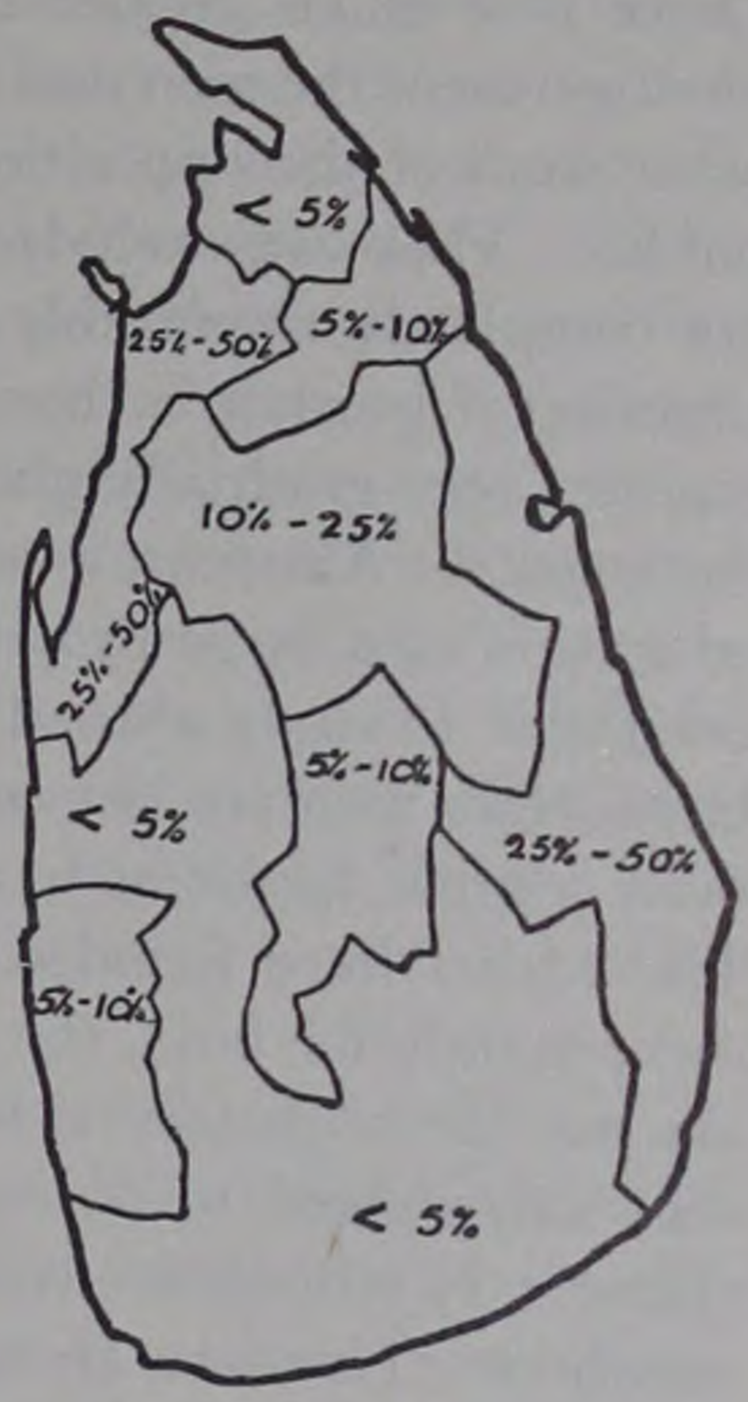

FIG. 86.
Percentage of Moors in the different Districts according to the 1921 Census.

The Ceylon Moors are permanent settlers who are descendants of Arab traders of previous generations, many of whom acquired wealth enough to buy land with which they endowed their descendants. They are a settled community on the whole, rather more than a third of them being either landowners or agricultural workers ; the rest follow a variety of miscellaneous occupations such as fishing, trading, shop-keeping, and the various professions. Like the Tamils, they have always lived in almost entire separation from the Sinhalese, adhering to the code of life of the Muslim religion, which the Arabs have carried with them into every land which they have penetrated. In some ways they resemble the Tamils more than the Sinhalese, especially in practising the seclusion of women and having their houses comparatively " closed." They are, however, in this respect much more severe than the Tamils, and continue the Arab custom of veiling women, in a modified form. The women long ago adopted the use of the saree instead of Arab dress, but usually keep to the fashion of having it made of white cotton material covered with embroidered holes, the end of which they throw over the face on going out into the street. When riding in carriages, also, the Moorish women of the upper classes practise the most rigid seclusion. The reason for the persistence in this custom by the Arabs has already been discussed ; it is a relic of their former primitive life in Arabia. The dress of the men has likewise become modified, though they

retain the Arab custom of covering the head with a small cap (this cap has many modifications in Ceylon, from the red fez to a small white cotton skull-cap), and of wearing a close-fitting coat which buttons right up to the neck. There is a much greater difference between the standard of education and intelligence of the men and women than amongst either the Tamils or Sinhalese on account of the opposition of the Muslims to the appearance of women in public. They are excluded from attending the mosques, and their husbands are completely responsible for carrying on all the religious observances. The practice of purdah is, however, like many of the other relics of the ancient regime, very gradually giving way under the influence of modern education. Amongst the Muslims, as well as amongst the Tamils and Sinhalese, the super-education of a large proportion of the men of the wealthier classes who have been able to study abroad, has led to their finding it a great inconvenience to have wives who are not educated to a similar level. This has in recent years been a great factor in hastening the movement for the education of women. The Moors have founded a number of good educational institutions of their own, mainly for boys, the chief of which is Zahira College in Colombo ; they are not averse, however, to attending the schools of other communities, which they are obliged to do in all the smaller towns outside Colombo. Separate elementary schools are run by the Moors in places where they are in sufficient numbers. They are always recognisable by those who know Arab schools in other parts of the world, by the custom of chanting the work aloud ; they are usually attached to mosques. The food of the Moors differs a good deal from that of either the Tamils or Sinhalese. The Arabs as a rule prefer to use wheat, and though in Ceylon they have been obliged to adopt the use of a great proportion of rice they retain a form of wheat cake which is common in most Arab countries. Their mode of cooking rice, with sultanas and fat, making a dish called Buryani, has become characteristic in Ceylon. They eat relatively much more meat than either the Sinhalese or Tamils, though they are prohibited from eating pork. As they do not object, like the Hindus and Buddhists, to the taking of life, there are more Moors keeping butchers' shops than either Tamils or Sinhalese.

The so-called Indian or Coast Moors are on the whole a different type of people and their settlement is not permanent. They are mainly petty traders coming from the Malabar Coast of India, about a quarter of them being merchants and traders. A number run small sailing vessels for purposes of local trade round the South Indian coasts, and stay for short periods in Ceylon.

They have greatly influenced a few of the coast towns, like Beruwala, which has a distinct Moorish settlement and a small harbour where they are able to land their boats. Kattankudi, near Batticaloa, is a very interesting exclusively, Moorish settlement. They ply a great variety of occupations, many being either domestic servants or in the employ of tea planters for certain special forms of work. They have, unluckily, a somewhat bad name in the popular imagination for trickery in trade. Having accumulated an amount of money by this means, Coast Moors very often lend it out to poor landowners in times of stress at a high rate of interest ; on failure of payment, they gradually get a hold upon the poorer agricultural people, who fall completely into their power. There are many proverbial tales, such as how from two bushels of paddy valued at three rupees a Moorman eventually, by the accumulation of interest, was able to obtain a poor man's property worth about 2000 rupees. Needless to remark they are not as bad as popular tradition would lead us to suppose ; but like the Jews in Europe their usury has become proverbial. Witness the Sinhalese proverb, " There is no place where the Moorman and the crow cannot be found."

The **Baluchis,** a very small community, numbering only a few thousand, have in a similar manner made themselves notorious, and are generally feared by the poorer population. The Baluchi moneylender waiting about in the street outside the door of his victims, is a picturesque though dreaded sight, quite familiar in the villages and towns. He is a striking figure, usually tall and well-built, and very much fairer-skinned than any of the other people commonly seen in Ceylon, except the Europeans. Like the Moor, he belongs to a completely different race, another branch of the Aryan stock. The dress is totally different from that of any of the other races of Ceylon. The cloth is worn in the Indian style, so as to look like long baggy trousers ; this is surmounted by a long loose coat of white cotton coming nearly to the knees over which is worn a sleeveless jacket of black velvet or some dark-coloured cloth. A large turban is worn on top of a red fez, in a style something like the Arab but really quite distinct ; a walking-stick is often carried. The Baluchis are Muslims like the Moors, and therefore resemble them a good deal in their mode of life. Their homes are mainly in Colombo.

Another small community of people is formed by **Malays.** They mainly consist of the descendants of a Malay regiment which once garrisoned Colombo, and who, after inhabiting the island for a number of years adopted it as their home. There are also, no doubt, a number of Malays who came to establish

trade connections with their native land. They are nearly all Muslims, and hence follow the Muslim code of life and worship in mosques. They are mainly in or near Colombo, about one-tenth of them being members of the

FIG. 87.
Baluchi at Trincomalee.

Police Department ; some, however, are connected with tea plantations and agriculture, as owners, or superior staff, as well as general labourers. About one-twentieth of them are domestic servants. Their dress resembles that of the Sinhalese, the sarong being common in Malaya ; unlike the Sinhalese, however, they usually cover the head in Mohammedan style.

The European custom of supplementing armies with foreign troops is also responsible for a slight Kaffir element in the population of Ceylon. A Kaffir regiment which was stationed in Puttulam district during last century intermarried with the Sinhalese, and is no doubt responsible for the people having black skin and woolly hair, more like the inhabitants of Africa, who are occasionally met with at the present day (see Fig. 88).

The **Burghers** are the descendants of Dutch settlers who came to the island after the Dutch Conquest during the seventeenth and eighteenth centuries. The Dutch were essentially traders, but they wanted to form colonies, and their Government encouraged the settlement of Dutch citizens in all their colonies,

even to the extent of advocating inter-marriage with the native population. Through this there came to be a considerable number of people whose fathers, at any rate, were Dutch. A number of them were pure Dutch, and inter-married only with other Europeans, mainly English, and hence their descendants are European in type. They have a fair skin, and the stronger and more heavy physique of the people of north-west Europe. Those who inter-married with the Sinhalese or Tamils have descendants who are various shades of brown ; the different generations vary greatly in colour. Sometimes a Burgher resembles a pure-blooded Sinhalese or Tamil, with little trace of the European in physique, while occasionally a child is born almost pure white and looks just like the English or the Dutch. The Burghers have always preferred to remain European in customs ; they are mainly Protestant Christians of the Lutheran type like the Dutch, and have no religious restrictions on their food and drink. Their food has naturally become greatly modified, and many have adopted a rice diet very much like the Sinhalese ; a large number, however, keep to the European type of meal, using wheat bread much more than rice, and such articles of diet as the traditional porridge and eggs and bacon of the Englishman with a dinner of meat, vegetables and " pudding." Their social customs naturally contrast strongly with those of the Sinhalese, as they believe more in the free mixing of the sexes, and enjoy European forms of amusement, such as modern dancing and music, horse-racing, etc. The development of girls' schools has been much handicapped by the lack of unmarried teachers, particularly because of the early age at which most girls marry. The average age of marriage for the whole country was, in 1927, 27·2 years for males and 20·9 for females. Amongst the Kandyan Sinhalese three-quarters of the women married in 1927 were under twenty-one, and the percentage amongst the Tamils and Moors was still higher. This means that hardly any women are available to teach in the schools above the age of twenty-one ; just as they are becoming more mature and useful they give up their work to get married. In supplying so many good teachers for the girls' schools the Burgher women have performed a most useful function, which ought to be recognised with gratitude by the whole of the inhabitants of Ceylon.

FIG. 88.
Boy with Kaffir features.

In the census report the Burghers are classed together with a small number of Eurasians of mixed stock, the total number of both in 1946 being 36,000, ·5 per cent. of the population. They form an active and interesting community which has always been noted for its energy and enterprise. The greater number of Burghers are employed in shop-keeping and trade, or are in Government service, especially on the railways ; comparatively few of them are farmers. They thus retain the original characteristics of the Dutch from whom they are derived. The name " Burgher " which has come to be used in Ceylon almost as a race name is really only the Dutch word for " citizen." The Dutch language was retained for household use, and in churches and schools, for quite a long period by the Burghers ; at the present time it has practically died out, and is not even taught in the schools. The latter have, however, retained a good deal of their Dutch character.

In 1946 there were 5000 **Europeans** in Ceylon, most of whom were British. Before the 1914-18 War there were a number of Germans, including the small colony of students of Buddhism who became priests ; during the war, however, they were expelled, and very few returned. (The Germans have contributed a great deal to the study of Buddhism in Europe.) The British may be divided into three groups : Government officials, planters, and missionaries or educational workers ; the planters form the biggest group, and have gradually been increasing in numbers during the last hundred years.

The **British** as a race are distinguished by their white skin, wavy hair (which is often fair in colour), and a taller and broader physique than most of the races of Asia : they are as a rule from six inches to a foot taller than the Sinhalese. They are nominally Christians by religion, though a large number of them at the present day observe no particular form of religious worship. This religion is much more vague than any of the other three great religions which are represented in Ceylon. It gives only general rules for moral guidance, and involves the belief in a personal God. On account of its vagueness, it is much more adaptable to different countries than any of the other three religions, though for this same reason it is not so easy for illiterate people either to learn or follow, because it leaves so much to personal judgment. It was initiated in Palestine, something in the same way as Buddhism, by a great teacher called Jesus Christ, who attacked the Jewish religion on account of its degeneracy, and suggested a large number of reforms. The Jews were following a theistic form of religion with a detailed code of life which had been formulated possibly as early as the sixteenth century B.C. by a great leader of the people,

called Moses. This code, together with the history of the ancient Jews, is preserved in the first portion of the Bible, which is the chief religious work of the Christians. The reformed teaching is preserved in the latter part of this book, under the name of the New Testament. Unlike Buddha, Christ advocated the retention of belief in a personal God, though he advised the people to give up their superstition and many of their corrupt practices. The code of life of the Jews, which was intended particularly for its country of origin, has been largely abandoned by Christians, though they do actually carry out a good many of the rules, which long experience has proved to be beneficial to the welfare of any race. Christianity has altered considerably since its initiation nearly two thousand years ago, and has, like Buddhism, become modified as it has spread further north. It is now broadly divisible into three branches—(*a*) the Roman Catholic Church, which claims the greatest number of adherents, and belongs mainly to south-west Europe; (*b*) the Greek Catholic Church, belonging mainly to south-east and eastern Europe; (*c*) the Protestant Church, belonging to north-west Europe, which has abandoned a great deal of the ritual followed by the other two, especially in the so-called "Nonconformist section." Christianity (especially in its modern form) differs greatly from either Hinduism or Buddhism in that it impresses upon people the importance of action, instead of placing meditation first. This is no doubt due to its propagation amongst the more physically active people of northern countries. Like Mohammedanism, it is propagandist and missionary in type, and its advocates have, during the last three centuries, spread to all quarters of the globe; wherever they go they have a very strong influence and in former times were exceedingly intolerant, though not so aggressive as the Muslims. The Roman Catholic branch of the Christian Church was the first to reach Ceylon, and it has always continued the most active propaganda and claimed the most adherents. The Greek Catholic Church has never been introduced. The Dutch first brought the Protestant form of Christianity, which has become divided into a great number of sects, each in turn sending missionaries to the island. The chief of these are the Church of England, the Lutheran Church, the Wesleyan Methodist, and the Baptist. These different sects, which often appear to an outsider to be mutually antagonistic, only differ very slightly on small points of doctrine and in the way they conduct their religious worship. They differ about as much as the different sects of Buddhists; such sects occur in almost every religion, as the teachings are interpreted differently by different individuals and nations. To a non-

Christian inhabitant of Ceylon these different sects present a somewhat puzzling problem, because they usually make more of their differences than their similarities. The code of life introduced by many missionaries has been that of their own nation rather than of their religion. The early missionaries introduced many ideas belonging to colder lands—*e.g.* relating to dress ; they considered it barbarous and indecent to go about scantily clothed, as was common in Ceylon and obviously more suited to the climate. The founder of their religion had probably himself been clothed more like the Ceylonese, and had many of their habits, as he was essentially "Eastern." Ideas on living have greatly altered amongst the British during the twentieth century. Apart from this somewhat ignorant insistence upon inessentials, the Christian missionaries have contributed greatly to culture in Ceylon. Though the religion is not acceptable to all Ceylonese, there is much to be learnt from it, as from all highly-developed religions, and the study of a people's religion is usually a great aid to the understanding of their habits and mode of life.

The food of the British is very different from that of the Ceylonese, and as a rule they are somewhat conservative and feed largely upon imported goods. There are indeed a number of British residents in Ceylon who have never heard of many of the ordinary Sinhalese foods. In spite of the hot climate many of them eat rather a large proportion of meat, and retain such heating foods as oatmeal porridge and eggs and bacon for their morning meal. They usually eat more rice than they do at home, but retain wheat as their chief cereal, and use wheat bread as their principal staple food. On the whole they expect a greater variety of food than the Sinhalese, because the extensive trade of Britain has during the last century placed more things at their disposal. In place of rice and curry, the British generally eat meat for their chief meal (cooked in many different ways), together with vegetables, more especially the potato ; sometimes wealthy people have fish and soup before this meat course. It is generally followed by a dish called "pudding," which is made of some kind of cereal, such as wheat, maize, or rice, with the addition of such things as fruit, eggs, or milk. Rice is more often made into one of these puddings by cooking it with sugar and milk ; it is not so often eaten by Europeans, in the Sinhalese manner, simply boiled in water. . In Ceylon the British do alter their mode of life a little, while retaining most of their own customs. They eat more fruit, and somewhat lighter foods, and, on the average, take more alcoholic drinks than they do in England (though it must be added that many missionaries are total abstainers). If people have an inferior water

supply, they are bound to use alcoholic drinks, and some form of fermented drink has been in use nearly all over the world; this accounts for the use of "toddy" in Ceylon; in the Island of Delft there is so little fresh water that people are obliged to drink toddy, and this has been the case in many countries of Europe. Hence the use of wine and beer, which in Ceylon has come to be associated with Christians. The whisky of the British corresponds to arrack, which is made by distilling almost pure alcohol from toddy. Both whisky and arrack, on account of their concentration, are dangerous when used in excess.

The clothes of the British are exceedingly different from those of the Sinhalese and are adapted to their cold and changeable climate. In Ceylon they generally wear the clothes which in England would be regarded as suitable for a hot summer, replacing most of their woollen articles by cotton and silk. Another difference is the custom of always wearing shoes and stockings, which is a necessity in a much colder climate. The British generally wear some form of head-dress out of doors, but in Britain it is very different from the solar topee which they wear in Ceylon. At home the man's hat is completely different from the woman's—made perhaps of the same material, *e.g.* straw or felt, but without fancy trimming. Owing to the complete protection from the sun's rays which is afforded by the topee the Englishman's face becomes much paler in Ceylon than it normally is at home.

The health of the British was at one time very bad in Ceylon owing to the injurious effects of the climate and of diseases to which they were not accustomed. The remarkable progress, however, that has taken place in medical science during the last century, has enabled them to acquire a knowledge of the cause and cure of many tropical diseases, including malaria. It is now possible for a white man to live quite healthily near the equator if he takes reasonable precautions, and he can even avoid malaria. The development of physical and biological science by the British during the last fifty years has also been remarkable and has enabled them to undertake the direction and improvement of agriculture in many parts of the tropics. They are colonists partly by instinct and partly by necessity, for their land has become more and more overpopulated in recent years. Their contribution to world culture has been very great in many directions, but particularly important in the direction of organised government, trade, applied science and navigation.

In a study of races it is difficult to avoid comparisons and to ask, at the end, which has reached the highest level of civilisation. The subject has already been approached in discussing the effects of climate on man, and enough has

been said to warn the student that this is a very big question and should be tackled with caution. An addition to this subject has been given in this chapter in the quotation from Rin Chen Lha Mo. The Ceylonese student has access mainly to literature in the English language, and in geographical as well as general works English authors generally assume that the English are the most highly-civilised people in the world. It is, however, not quite within the province of geography to decide such a question ; it is rather the province of this science to describe what exists everywhere so that the student may see the world in perspective and widen his ideals. The Asiatics have generally been described in English works as being " backward " or " behind the times," more especially by people whose views are vitiated by a perverted notion of the relative importance of Western mechanism. It must be remembered, however, that there are many people who own motor-cars, telephones, gramophones, and every kind of modern material convenience, who are savages at heart. The mechanism of the engines of destruction used in the World Wars of 1914-18 and 1939-45 was marvellous, yet they were engines of barbarity, and the wars themselves were among the most amazing outbreaks of barbarity that the world has ever witnessed. This occurred amongst a group of nations that have contributed enormously to world culture but were putting their knowledge to wrong use. The Sinhalese villager is not necessarily uncivilised because he is simple. The inhabitants of Ceylon are very different from Europeans. Some of the contrasts have been already pointed out and the student is advised to carry them further. In Ceylon there are unusual opportunities for the study of different races and it is easy to follow up the problem of how far man is influenced by his inherent race characteristics and how far he is subject to what is commonly called " geographic control." Some race characteristics can never be explained away ; it is not easy to see why the Tamils and Sinhalese cremate their dead while Moors and British prefer to bury the body in the earth ; or why the Buddhist uses a tom-tom in his funeral procession, the Hindu only a drum, the Muslim uses no instrument but chants verses of the Koran, and the Christian procession moves in absolute silence. These things make life diversified and interesting. In a land like Ceylon it becomes an important duty of all young people to study particularly all races with whom they are likely to come into contact. Only by this means can peace, understanding and co-operation for the public good be secured.

PART IV. CHAPTER 4.

DEVELOPMENT OF HUMAN HABITATIONS AND SETTLEMENTS IN CEYLON

The conditions which have determined the development of human habitations and settlements in a land of uniform heat and moisture are very different from those prevailing in the Temperate Zone. What man requires of a dwelling-place is very different in a warm land with no seasonal changes from one in which his needs vary with the season ; when there is a cold season he will be obliged to live within the walls of the building for some portion of the year, while in the former instance he will not have to remain continually in his house. This fundamental difference between equatorial and temperate lands very profoundly affects nearly all the habits and social institutions of man, and in particular the form of dwelling and type of settlement which he creates.

The even temperature of Ceylon renders possible a very open-air life, and as far as this factor alone is concerned man could live quite free from the encumbrance of a house ; he requires shelter mainly for protection from the rain and from wild animals ; the latter factor is becoming less important at the present day and hardly exists in the more populous regions though it is a matter of vital importance in many of the jungle villages. A hot wet climate possibly develops more abundant animal life than any other type, and even the jungle dwellers of to-day can hardly realise the elementary struggle of primitive man for survival amongst the myriad animal and insect pests with which he was surrounded. The persistence of this primitive instinct for self-preservation probably explains a great many race habits the reasons for which are not now obvious. We notice, for instance, a tendency to construct a house with a thick solid wall with as few doors and windows as possible, so that during the night it can be completely shut up and protect the inhabitants from such sources of danger as snakes, marauding elephants, or noxious insects. Many visitors to Ceylon from lands where these dangers have ceased to exist, or were never so acute, are surprised to find that a large number of the

inhabitants shut up their houses at night and seem to dislike the idea of apparently healthy ventilation; but it is not so long ago that this was a real necessity.

There seems to be little doubt that rain has also considerably influenced the method of building. In less rainy lands the side walls are commenced first, and the roof is added last; whereas in Ceylon the tendency is to construct the roof on a series of supports first, and to fill in the walls afterwards. As the dominant rainfall is convectional, and not associated with wind, walls and windows are not needed to keep out the rain; so that in buildings not intended for sleeping purposes the side walls are often omitted, or only partially filled in, while an open verandah is a necessary part of the normal dwelling.

When a man spends so much time in the fresh air in pleasant sunshine and a somewhat enervating atmosphere, he has a natural tendency to construct his shelter with a minimum amount of trouble. There is no particular stimulus to the construction of large permanent dwellings when so little time is spent within them; so that in spite of the antiquity of civilisation in Ceylon, domestic architecture remained comparatively simple to a late date in its history, and would probably have remained simple for a much longer period had it not been for the influence of the European invaders. If material is easily accessible, as it is everywhere in Ceylon, the house can be easily renewed, and permanence is not a great consideration. The climate, also, seems to encourage an inconsequent frame of mind; a man composes himself in the comfortable warmth and unconsciously adopts the attitude expressed in the phrase: "After all, why worry when the sun shines?" In lands where provision must be made for a long and inclement winter, during which people will die of cold when not adequately protected, they will regard the construction of a permanent dwelling as a serious business with which they must be busily preoccupied. At the present time in Ceylon there are practically no traces, therefore, of ordinary dwelling-houses dating back to more than about a century, excepting a few buildings constructed by foreigners, especially the Dutch.

It seems probable that the aborigines lived in caves and would, like the modern hunting Veddhas, find it more healthy to sleep on the bare rock. Quite a number of caves have been found containing prehistoric stone implements which seem to indicate that they were used for a long period by primitive men. The Ramayana suggests that there were substantial settlements some two thousand years B.C., but the first indication of a well developed town occurs

in the Mahawansa. There appears to have been a Yakkha settlement called Lankapura, outside which Kuveni was killed ; but there are no particulars of its design. Possibly the first thing that might be called a dwelling was of the same type as that used by the Veddhas when they were unable to find a cave. Even at the present day the hunting Veddhas often construct rough shelters by

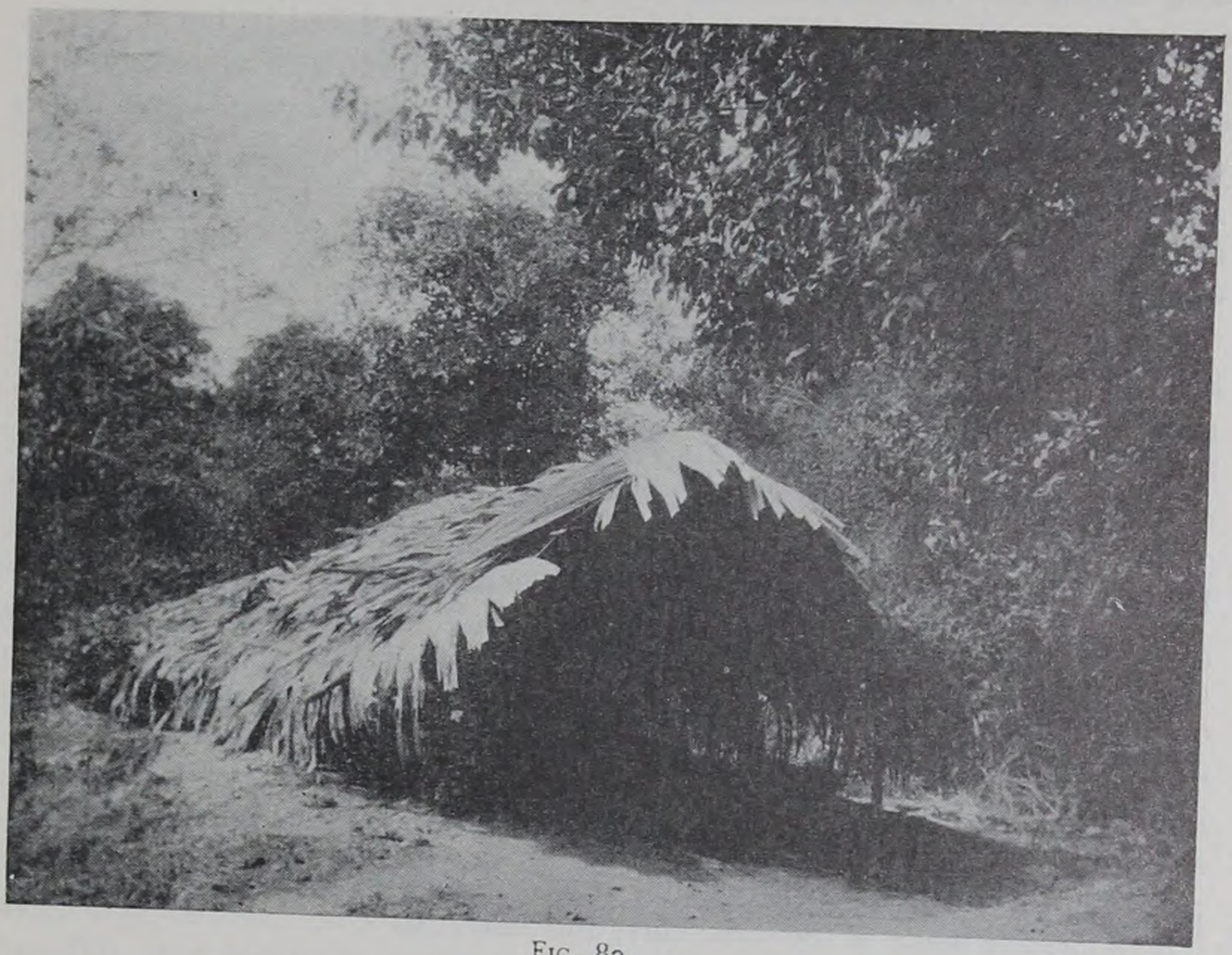

FIG. 89.

Simple Shelter made of Palm Leaves on a Wooden Framework.

putting together the branches of trees or large leaves when they wish to sleep on the surface of a rock. The dried leaves of palms, like the Talipot, or Palmyra, were probably used for the construction of shelters at an early date ; with but a light framework made from the branches of trees a roof would be constructed which would remain watertight for a considerable period (see Fig. 89). Cadjan thatch (made from the plaited leaves of the coconut palm), which is so common at the present day, probably represents a development of

this method. By degrees more complicated structures were developed, including thatches of rice straw. The majority of small village houses are at present thatched with either rice straw or cadjan.

It is probable that the new-comers from India during the sixth century B.C., who came from a part of the Ganges Basin which was more civilised, brought with them a new type of dwelling. No one knows how early the simple four-walled house came into being; they may have introduced it, but it was no doubt the result of a gradual development and owed its origin to the ease with which it could be constructed from the clays of the fertile alluvial land in which paddy culture originated. The beginnings of paddy culture are lost in remote antiquity. At the time of Vijaya's landing it had long been known in the Ganges Basin, and even before that in China. Its cultivation for use as a staple food plant tended to draw the inhabitants, hitherto dispersed by hunting, down to the alluvial soils of the valley floors, and it has continued throughout the historic period to be the chief factor in determining the distribution of population in the monsoon lands of south-east Asia. The characteristic clay-walled hut (see Fig. 90), constructed upon a wooden framework, and thatched with rice straw, which seems to be a natural development on these alluvial plains, is in Ceylon the fundamental type of dwelling (except in the Peninsula). It is not very permanent, but can easily be replaced. It comprises as a rule a minimum of two closed rooms, one for the kitchen and store the other for a sleeping apartment; the roof projects far over the walls to create shade, and at one side covers an open-air room, or verandah, where most of the every-day affairs of life are conducted. Reference has already been made to the reason for the lack of windows, and to the fact that the inside rooms are not much used during the day. The thick clay wall is a very satisfactory protection from the heat of the sun, and such a house can be kept very cool. The floors are made of the same clay, and may easily be renewed by a clean layer. This type of house, with slight variations adapting it to different climates, is very widespread in the world on alluvial plains. Readers of English in Ceylon will perhaps meet with references to the "Cob Cottages" of Devonshire, one of the southern counties of England. These are built on a similar principle, with wheat instead of rice straw and two stories instead of one; they were formerly much more common than they are to-day.

By degrees other materials were drawn into use for house construction; these would vary greatly according to the resources of particular localities. A very natural step in development is to select portions of stiffer clay, make them

into a form which can conveniently be handled, and dry them in the sun, making what we call " bricks." The use of these, however, necessitated some form of cementing material ; originally wet mud was used, but this was not very effective for hollow structures. The use of lime for mortar was probably not discovered in Ceylon until about the sixth century, when it was used for the

FIG. 90.

Typical Clay-walled House, with Rice Straw Thatch, inhabited by Peasant Farmer and Family (in foreground) at Bibile.

fortress on Sigiriya Rock, so that before that time people could only develop solid structures made of bricks, and could not use them for houses. That is possibly the reason why the early dagobas were built with a solid core. A comparatively primitive type of brick, which is a rough block of sun-dried clay, can be seen in many houses along the southern and eastern coasts at the present day. The Kabouk brick, belonging to the south-west quarter of the

Low-Country, is of a similar character. In recent years a considerable industry has developed in the districts well supplied with a certain stiff reddish or brownish clay which makes a very fine type of durable brick ; the chief centres are in the Kandy District, the Badulla District, and the region just north of Colombo. The manufacture of this type of brick has led to the development of the tile, which is made on the same principle by baking the clay, and which now is tending to replace rice or cadjan thatch as roofing material ; it is

FIG. 91.

Larger Type of House, made of Kabouk and thatched with Cadjan. Preparation of Cadjan in foreground.

superior in durabiiity to the latter materials and its extended use has depended mainly on the development of railway transport. The type of tile in use is similar to those used by the Dutch in Holland and was possibly developed after the Dutch occupation. Along the south-west coast, where coral is so abundant, roughly from Induruwa to Matara, rounded lumps of coral are used a good deal to replace bricks. This demands the use of a considerable amount of cementing material. The mortar is made by burning the coral to make quick-lime, which is mixed with sand and water. Up country the crystalline lime-stone is used instead of coral.

The Jaffna Peninsula is the only part of the island where the stiff clay suitable for houses is scarce, and it is probable that the stone house was developed here at an early date, especially as the limestone can be very easily worked. Building stone is everywhere abundant in the rest of the island, but it was not used for houses until a comparatively late date. The work of hewing, shaping and transporting stone is so arduous that the tendency would be to leave it alone in such a hot climate if other material were available. Even at the present time

FIG. 92.
Stone Building with Corrugated Iron Roof on a Hill Slope near Matale.

stone houses are scarce, and are mainly developed by wealthy foreigners. They are numerous in Galle owing to the influence of the Dutch, who also built stone fortifications there, as well as in Batticaloa, Kalutara, Kalpitiya, Jaffna, etc. Rich planters who prefer to live on the slopes of hills, and can command a good supply of cheap labour, usually have their bungalows and other buildings made of stone (see Fig. 92).

Ceylon is remarkable for having developed stone buildings of a high standard at a very early period, many of which are even now in a very good state of preservation. Buddhist temples have always been largely made of brick ; the dagobas, which are the most characteristic feature of Buddhist architecture,

were solid masses of bricks. They form some of the most stupendous relics of early human activity in the world. Sir Emerson Tennant estimated that the Jetawannarama Dagoba, whose diameter is 360 feet and heigh 249 feet, contained enough bricks to construct a small town of 8000 houses each with a 20-foot frontage. They are probably the most remarkable brick structures ever erected. The temples like Dambulla and Aluwihare, which made use of natural cavities in the crystalline rock, were filled in with bricks. Most of the old State buildings were made largely of stone, which gradually entered more and more into the structure until about the eighth century, when buildings were completely made of stone. The majority of the ancient monuments which now survive were constructed during the Mahawansa (the Great Dynasty) between about 500 B.C. and A.D. 300 ; the most noted organiser of these great public works was King Dutthagamani, of the second century B.C. The brick buildings other than dagobas would rapidly decay, and very few of them now remain, so that the ruined cities mainly consist of dagobas and State buildings made of stone. Under the Suluwansa (the Lesser Dynasty) many of the great monuments were mutilated by Tamil invaders, who drove the inhabitants further south. The last we hear of Anuradhapura is in 1110. Under Parakrama the Great, during the twelfth century A.D., sufficient peace was restored for the addition of many monuments at Polonnaruwa and the restoration of others. At a later period the Tamils continued to ravage the north, and the last we hear of Polonnaruwa is in 1295. Afterwards came the invaders from Europe, who drew the inhabitants towards the south-west by the attraction of their trade and eventually drove the kings into the hills. During a period of several hundred years the deserted cities were gradually swallowed up by the ever-watchful jungle and lost to the world, in which condition they remained until about fifty years ago when restoration works were initiated by the British Government. Though much progress has been made during the last thirty years, a great deal remains to be done. The interesting city of Alutnuwara, for example, has received but little attention, and the jungle probably conceals many secrets for future discovery. One of the most astonishing performances was the construction of the brick palace on the top of Sigiriya Rock, an abrupt precipice of over 1000 feet high. These monuments give us no idea of how the ordinary people lived in that period. Their construction depended entirely upon the slave labour in command of the kings.

During the period of disruption following the European invasions, architecture, like most of the other indigenous arts, fell into decay. The dwellings

of kings were replaced by residences of government officials who introduced foreign methods of architecture. This state of affairs has persisted up to the present day ; in most of the modern public buildings art has been sacrificed to utility, and there has been a danger that the very fine features of Ceylonese architecture might be forgotten. The new Colombo Town Hall is a fine building, though foreign in design, while others such as the Hindu Temple in Sea Street, Colombo, and the Katchcheri of Ratnapura, show a revival of the true native art. Domestic architecture has been very much influenced by European ideas, especially by the Dutch. They are said to have introduced the type of house now so common for larger residences, with a front portico and verandah, central hall, and central courtyard, very similar to the type they developed in South Africa. In many smaller ways European influence is also evident, such as in the increased use of windows and the various patterns of doors and windows now employed.

Domestic architecture has naturally been influenced by the habits of life of the several races who reside in Ceylon. Perhaps the most important factor in producing differentiation was the difference in customs relating to the seclusion of women. This practice has always been characteristic of the Moors and Tamils, but not of the Sinhalese, and hence the houses of these two races are modified accordingly. The Sinhalese have retained the tradition of freedom for women as an ideal, though in practice seclusion has been necessary and rigorously enforced during wars and invasions, especially in the places most open to attack. Their houses, however, have always been of a more or less open type, and the garden fence has only been regarded as a boundary mark and not as a means of seclusion. Indeed, the Sinhalese villagers are remarkably informal in their relations with one another. The Moors and Tamils, on the other hand, have continued to seclude their women, and therefore developed a closed type of dwelling. In the Jaffna Peninsula we find that practically every garden has a high fence of palmyra leaves, and the roads are extremely uninteresting, because nothing can be seen of any domestic activity behind the fence. The more simple houses are built in sections within the enclosure, with sleeping apartments, kitchen, women's apartments, etc., all separate. The newer forms of town houses used by the Tamils resemble those of the Sinhalese, but are slightly more closed, the verandah being shut in by blinds or wood with trellis-work designs. The village Moors use a house more like the Sinhalese, but surrounded by a high fence. Kattankudi, near Batticaloa, is a typical Moorish settlement. In the larger towns the richer

Moorish merchants have developed a type of house similar to those of the Arab countries, a high building looking to European eyes more like a prison, with practically no windows on to the street, and opening inside on to a central courtyard, where the women spend most of their time.

FIG. 93.

Tamil House, built in Sections, with high Fence. Compare with Sinhalese houses.

There has latterly been a marked tendency for houses to become more uniform in type. Materials can now be more easily transported, big firms cut out the initiative of the private individual, and the rapid changes in education and other aspects of life have made it necessary to construct a large number of new buildings as quickly as possible, and these have tended to develop on a stock pattern. This, however, is possibly only a phase which may pass by when conditions become more stable.

A completely new form of human habitation, different from anything previously existing in Ceylon, has developed in the planting districts. The foreign planter has created an arrangement something like that which existed in England under the feudal system. It was then common for the lord of the manor to live in a large house on his estate near which he established a village, or block of small cottages for his farm labourers, who were in those

FIG. 94.
Tea Planter's Bungalow on the Hatton Plateau. Adam's Peak and wall of Hill Country in distance.

times, practically slaves, and remained uneducated. On the tea and rubber estates the planter has his large bungalow on the slope of a hill, and not far away are the "labour lines" where his labourers live in somewhat primitive fashion. They are, of course, paid workers, though their pay is comparatively small and many of them are illiterate and have a very low standard of living. The houses of this new type of village are usually made of stone (only occasionally of wood or clay), and quite frequently have roofs of corrugated iron, as they have to be erected rapidly. They are not always regarded as permanent settlements and have a shifting population, and hence little care is taken in their construction. There are, however, certain planters

who have taken a great interest in the housing of their labourers and have tried to create something in the nature of model villages with suitable Hindu household arrangements and many English innovations, *e.g.* in sanitation. As compulsory education is enforced the labourers themselves will no doubt modify these settlements, which are to be regarded as permanent features of the island.

We now come to consider the various factors which have determined the situation and arrangement of human settlements in Ceylon. The aborigines were probably not numerous, and as they were hunters they no doubt had settlements similar to those of the hunting Veddhas ; so that the first organised settlements would consist of the most commodious caves, in which all the members of a certain tribe could sleep and be protected from the wild animals by a single fire. These people would have no idea of private property, but would move about in certain portions of the forest, where they had indefinite rights for hunting or agriculture. As chena cultivation became more common they would make settlements near their crops, in order to drive away the animals at night. It is quite possible that the village of Lankapura, the first town mentioned in the Mahawansa, was a development from such a settlement.

The advent of Vijaya and his friends meant the introduction of a much higher level of civilisation. Here were people to whom paddy cultivation and irrigation works were already familiar, and within the course of a few hundred years they had established a series of settlements in the northern portion of the island, which on account of its dryness was more easy to clear. They blocked the rivers from point to point with huge dams, made mainly of soft earth, and thus created the remarkable series of storage reservoirs called in English "Tanks," in Sinhalese "Wewe," and in Tamil "Kulam." Near the tanks, and especially just below them in level, they constructed the equally remarkable series of paddy terraces, over which the water was carried in aqueducts and regulated with skill. The people would naturally be organised into groups for the purpose of maintaining the efficiency of the irrigation works and securing the fair distribution of the valuable water. These groups would also be organised for protection against wild animals, so that by the side of each tank, and if possible not on the land which could be used for paddy, a village would develop. If the paddy land was very extensive, as it would be round the bigger tanks, there might be several villages, so that the men would not have so far to walk to their work. The present tank villages are of a very compact type, quite different from those along the other types of paddy land. The number of tanks on some of the river systems is remarkable. In certain regions they

average one to the square mile. As they were all connected, the regulation of the whole system connected with each river must have involved a very high degree of social organisation. The largest tanks, which have dams ranging up to seven or eight miles in length, and cover areas up to about twelve square miles, are as follows : Giant's, Nachchaduwa and Malakandarawa Tanks on the Aruvi Aru, Kala Tank on the Upper Kala Oya, Kantalai and Minneriya

FIG. 95.
Nachchaduwa Tank.

Tanks near the Mahaweli Ganga, Rukam Tank near Batticaloa, Iranaimadu and Padawiya Tanks on smaller rivers in the north. These probably, therefore had the largest " tank villages."

The preponderance of place names ending in " wewa " and " kulam," in the north-eastern portion of the island, is some indication of the extent to which the tank has controlled settlement. At the present time a large number are completely deserted, especially in the south-east, but in the northern lowlands there are many small settlements which evidently represent what must have been large villages in the ancient days. The accompanying map illustrates some typical settlements. The villages were usually organised by a Headman, who would have a much larger house, probably slightly apart from the villagers,

and have a certain amount of their service at his command. Many of these Headmen became well educated at a comparatively early date, and their modern descendants now form a very distinguished group of people. There are practically no traces of fortifications round these tank villages, which is remarkable considering the amount of warfare that the country has seen. This is probably due to the fact that in ancient times war was only the profession of a particular caste, and had little to do with the average villager, except to oblige him occasionally to remove to another region. There is indeed a very striking absence of fortified settlements in Ceylon. The typical Sinhalese village is, and probably always has been, very open in character, which is due no doubt to the informal habits and open-air life of the people.

This open form of settlement forms a great contrast to the closed fortified villages which in the early days were so common in Europe. It was, of course, very speedily ravaged by the European invaders, who had no respect for the caste organisation, in which the warriors were separate from the farmers. The comparative ease with which food could be obtained in Ceylon, where crops could be grown all through the year, would naturally tend to make people less anxious about their survival under the disturbed conditions of war.

If the paddy land was compact in shape, the village would also tend to be compact, and probably develop a little street of shops down the middle. On the whole the people would be self-supporting, and the shops, few in number, would be kept mainly by Moorish traders in contact with the coast. If the paddy lands were long and straggling the houses would stretch in a long line, though always in comparatively close contact. Isolated dwellings were apparently very rare. The present tank settlements are very small, and often only consist of about half-a-dozen houses grouped together. The maps in this chapter show the number of dwellings marked on the one-inch survey maps. This number is not in accordance with the Census Report ; it is, however, proportionate and the arrangement in relation to other features is correct.

One interesting feature of the tank country is the fact that the modern roads bear practically no relation to the internal life of the region. They have been cut across it with the object of making a way from one important coastal place to another, *e.g.*, from Colombo to Jaffna or Trincomalee. Sometimes they cut through a tank settlement, while sometimes the road leads through apparently uninhabited forest, with hardly a sign of life on the way for many miles ; in the latter case there is often a series of tank villages some miles from the road, the people of which have very little to do with the outside

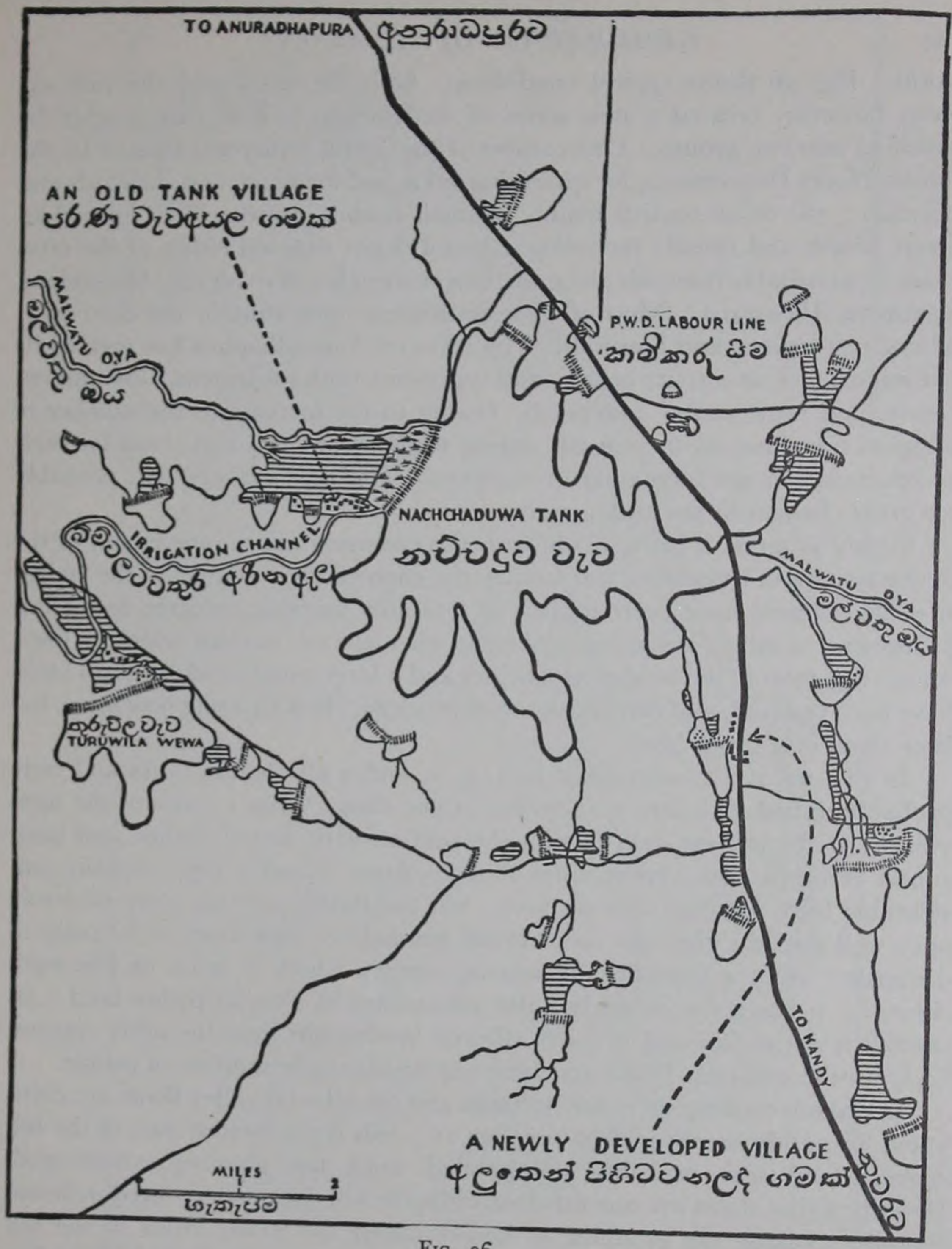

FIG. 96.

Typical Settlements in the Tank Country. Horizontal ruling denotes paddy land, black squares are houses, black lines are roads. The new village contains District Engineer's bungalow, Public Works Dept. labour lines, rest-house, post office, dispensary, ambalam and shops. Note course of main road.

world. Fig. 96 shows typical conditions. Both the roads and the railways have, however, created a new series of settlements. These can roughly be classified into two groups. One consists of the Tamil settlement formed by the Public Works Department, for quarrying stone and for repairs on the roads and railways ; the other consists mainly of small trading centres, often formed by Coast Moors and usually including a petrol depot situated either at the cross roads or at suitable intervals along the longer stretches of road, *e.g.*, Mankulam, Vavuniya, Habarana. Most of these settlements now contain the chief post-offices, rest-houses, and hospitals. The restored Anuradhapura has revived its old importance as a route centre, and represents tank settlement, Government centre, and route centre combined. Owing to the increase in the number of pilgrims travelling on these roads during recent years inns and shops for their accommodation are increasing in numbers. The next century will probably see great changes in the tank country.

Steady progress is being made with the extension and improvement of the major systems of irrigation, and latterly the engineering resources of the Irrigation Department have been applied in a rapidly increasing degree to the improvement of minor irrigation tanks and channels on modern scientific lines. Since 1933 most of the irrigation schemes and a large number of the small tanks have been restored, and colonisation is in progress. It is amazing how much has been done in a short time.

In Fig. 97, the areas marked as 1, 2, 3, and 4 all contain tanks and were probably dotted with tank settlements at one time. Area 1 contains the most villages at the present day, though the portion with dotted outline and horizontal ruling is now almost uninhabited. Areas 2 and 3 both contain considerable hilly portions with no tanks, but the flatter portions were evidently once well settled ; they are now almost uninhabited and most of the tanks in disrepair. Area 4 contains the talawa country which is more or less transitional ; it has a few tanks but also an amount of alluvial paddy land ; its rainfall is not so low and it is less affected by drought than the other regions. Only on the side near Bibile are there any considerable number of people.

In the hill country there are no tanks and the alluvial valley floors are cultivated for paddy except in area number 11 ; this is the wettest part of the hill country and was probably uninhabited until tea planting commenced. Here the valley floors are uncultivated while the hill slopes are covered with tea. Broadly speaking the grouping of houses round the paddy lands in the hill country presents two types. Fig. 99 shows a case where the floor of the valley

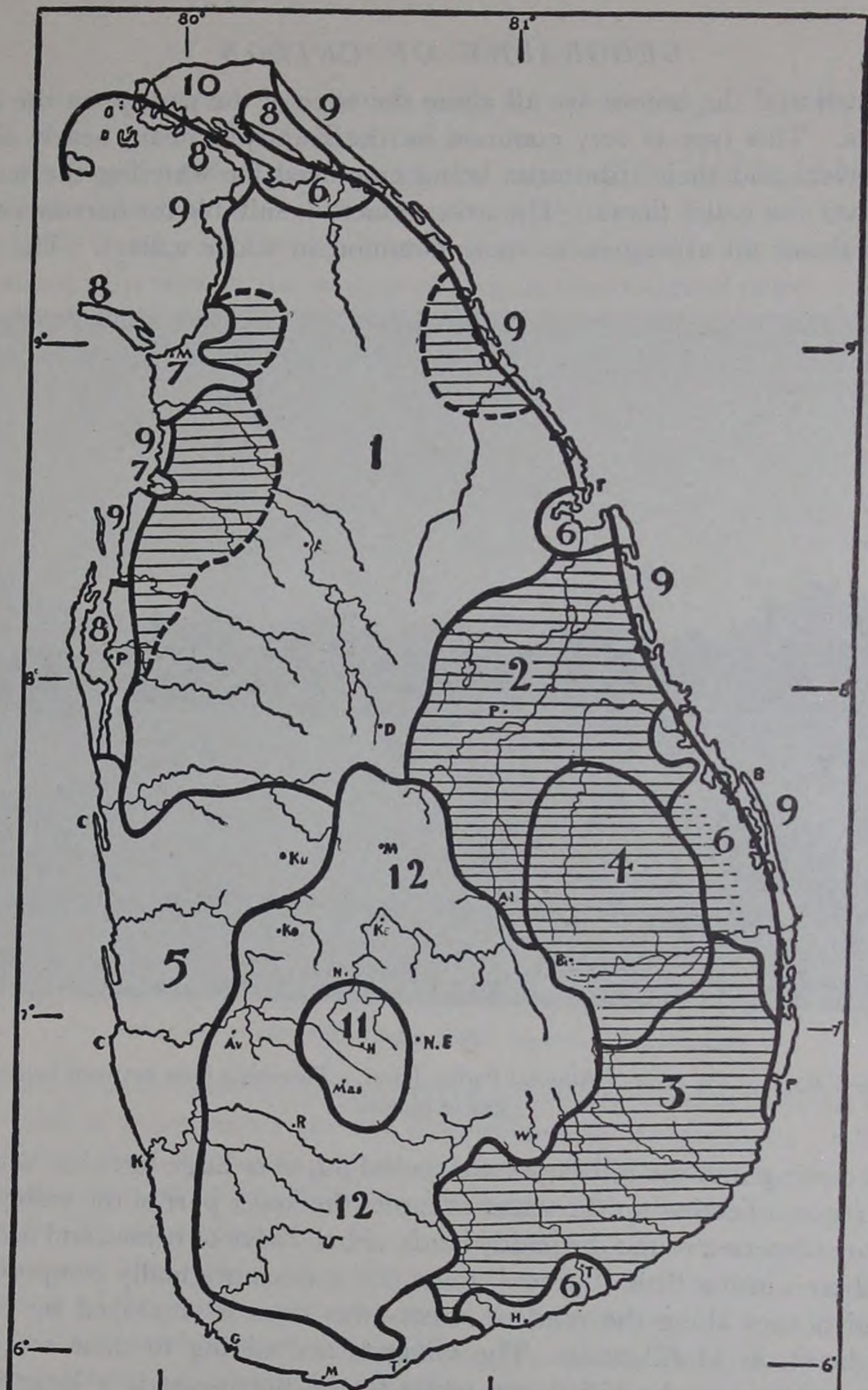

FIG. 97.

Key Map to Distribution of Rural Habitations. For explanation see text. The initial letters of certain towns have been inserted as an aid to the location of boundaries.

is cultivated and the houses are all along the edge of the paddy, on the lower hill slopes. This type is very common on the Kandy plateau, nearly all the smaller rivers and their tributaries being employed for watering the terraces which cover the valley floors. The arrangement is suitable for narrow valleys. Fig. 100 shows an arrangement more common in wider valleys. The small

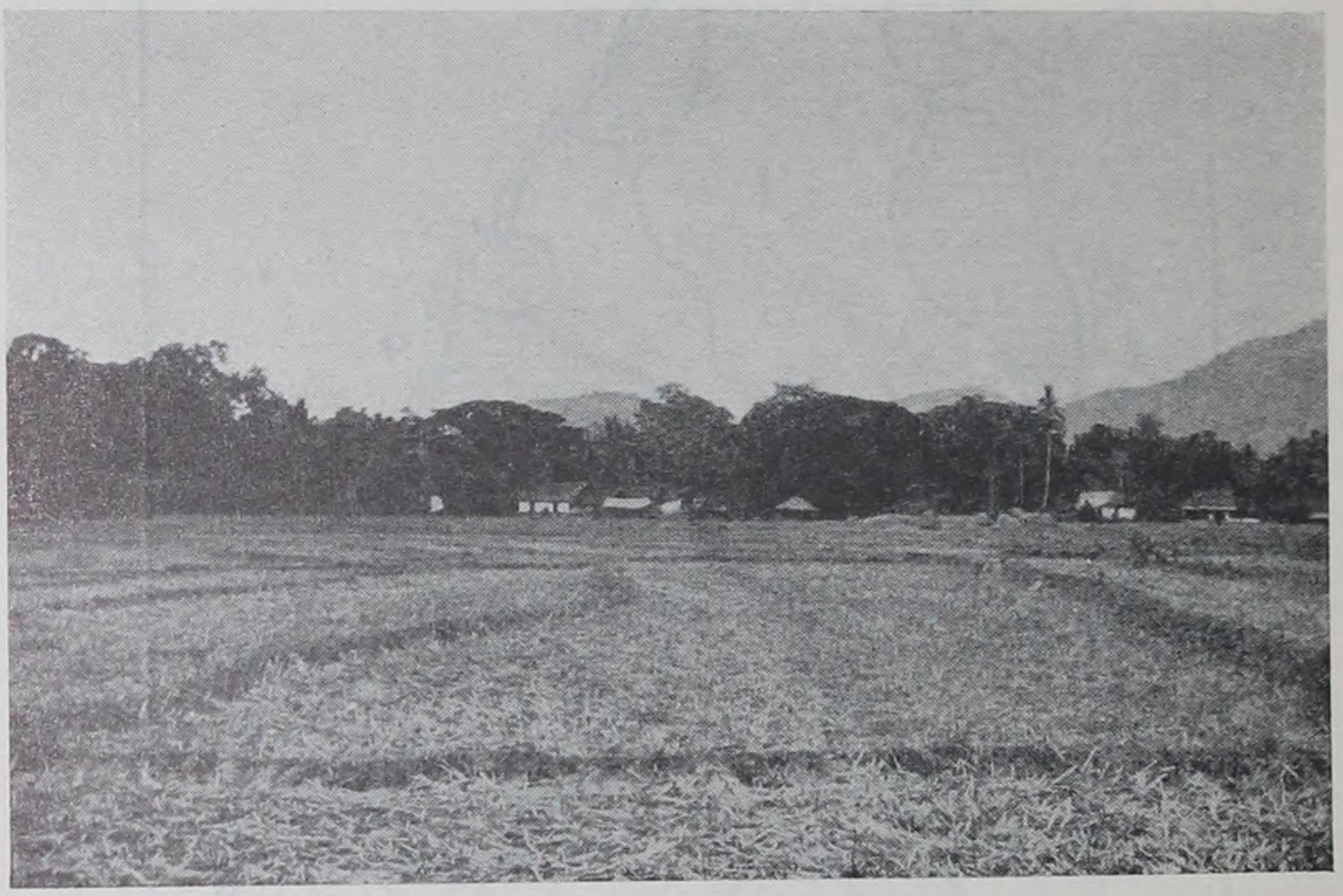

FIG. 98.

Bibile Village at the edge of Alluvial Paddy Land. Threshing floor between houses to right of picture.

streams cutting into the hill slopes are spread out over large terraces, while the main stream collecting up the water occupies the lower part of the valley ; the houses are dispersed round the paddy lands, either above or below, and occasionally gathered into a little " street " town (*i.e.* a town originally composed of a group of houses along the road or street—this term is employed by English geographers), as at Ellawala. The villagers are adding to their wealth by planting rubber on the hill slopes, while to the north-east is a large rubber plantation, off the alluvial lands, with isolated bungalows. In the lower part

of the main valley, near its junction with the Kalu Ganga Valley, is another little " street " town with the shops of traders.

It seems evident that paddy originally exercised the sole control on settlement in the hills exactly as it did in the tank country. Later was imposed on the original framework the new grouping connected with the tea and rubber plantations. In area 11 the latter grouping can be observed more easily as the paddy grouping is absent. Fig. 101 shows a portion of area 11. The planters' bungalows are placed on the hill slopes, some at a great height. The survey

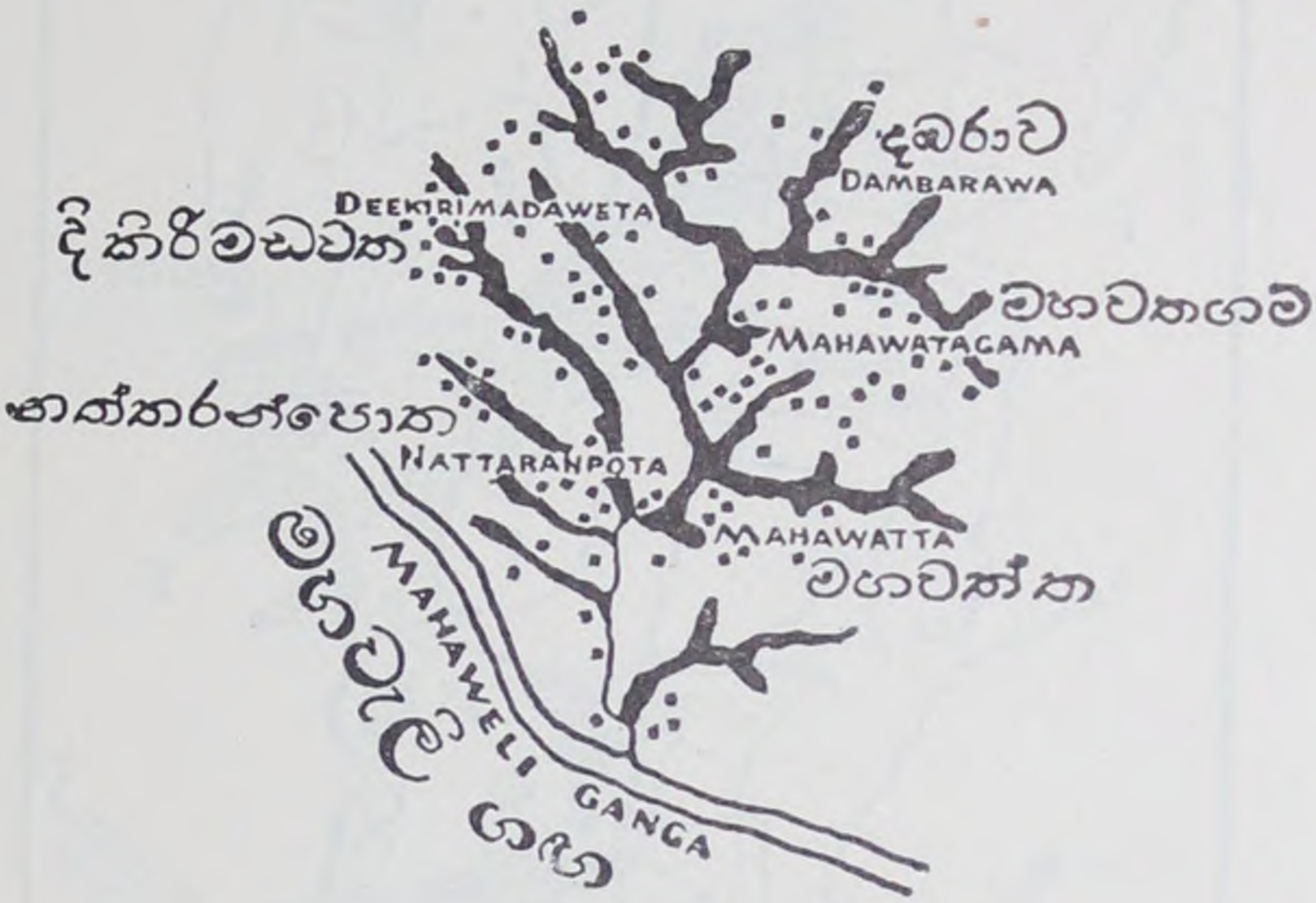

FIG. 99.

Dispersed Villages round " valley floor " Paddy Lands on the Kandy Plateau. Paddy lands are in block shading. Black squares denote houses.

map does not, unfortunately, distinguish the labour lines, but most of the squares not marked as bungalows represent labour lines or tea factories. No use is made of the valley floors. In the other parts of the hill country, area 12, this type of distribution of dwellings is intimately mixed with the two types associated with paddy culture.

The coastal lowlands contain the largest paddy lands and these occupy the flood plains of the rivers. Fig. 103 shows the appearance of one of these extensive tracts of land covered with paddy. Houses are rarely built on paddy lands on account of the necessary flooding and the great value of the alluvial soil. There are, however, a few areas, marked number 6 on the map, Fig. 97,

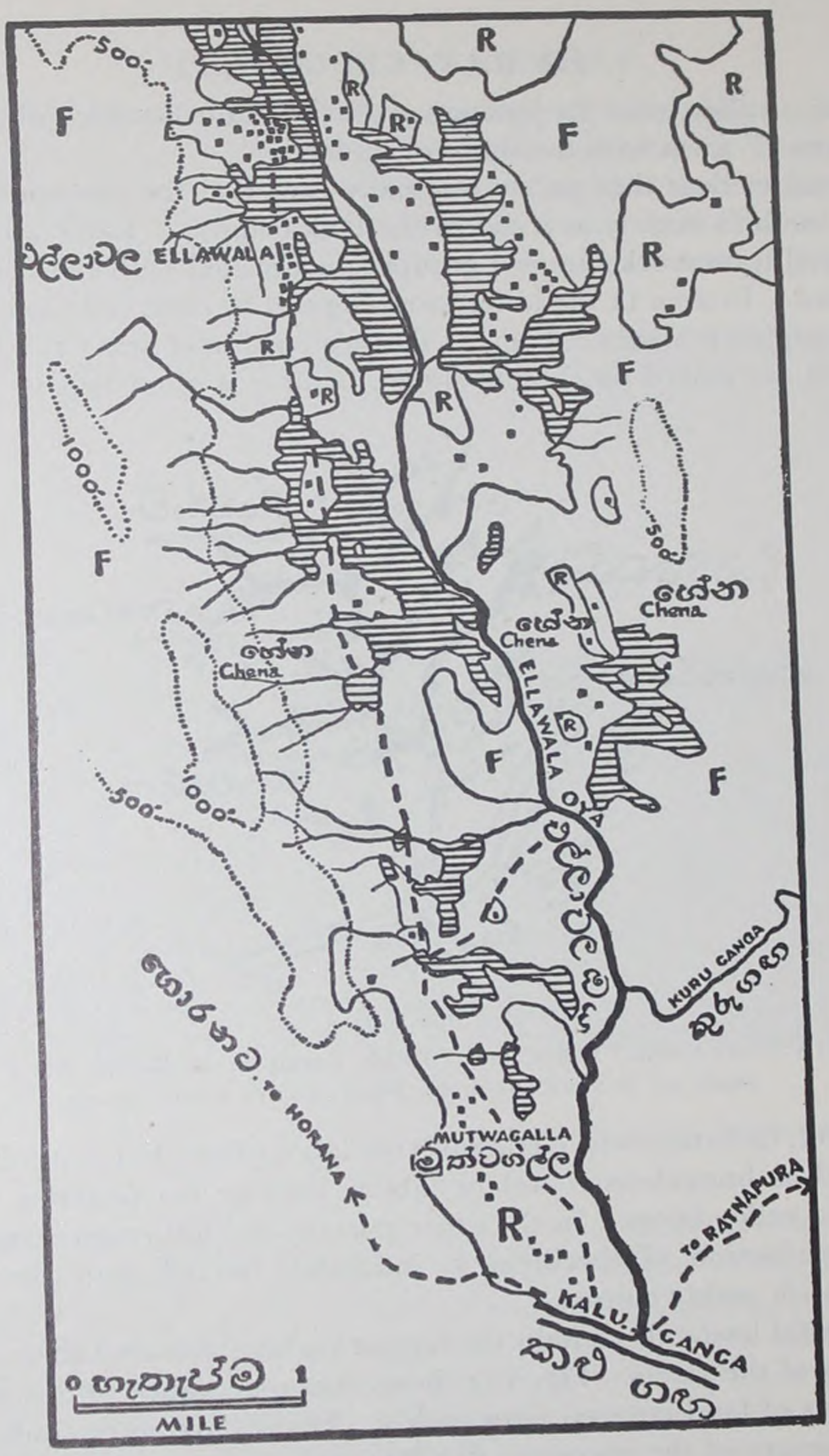

FIG. 100.

Development of Alluvial Paddy Lands in Upper Kalu Ganga. Horizontal ruling = paddy lands. Thick dotted lines = roads. R = rubber plantation. F = forest.

which have very extensive paddy fields with houses, each having a small garden dotted about, as in Fig. 103, which represents an area near Batticaloa. In the flood plains there are a number of stony or gravelly deposits rising slightly

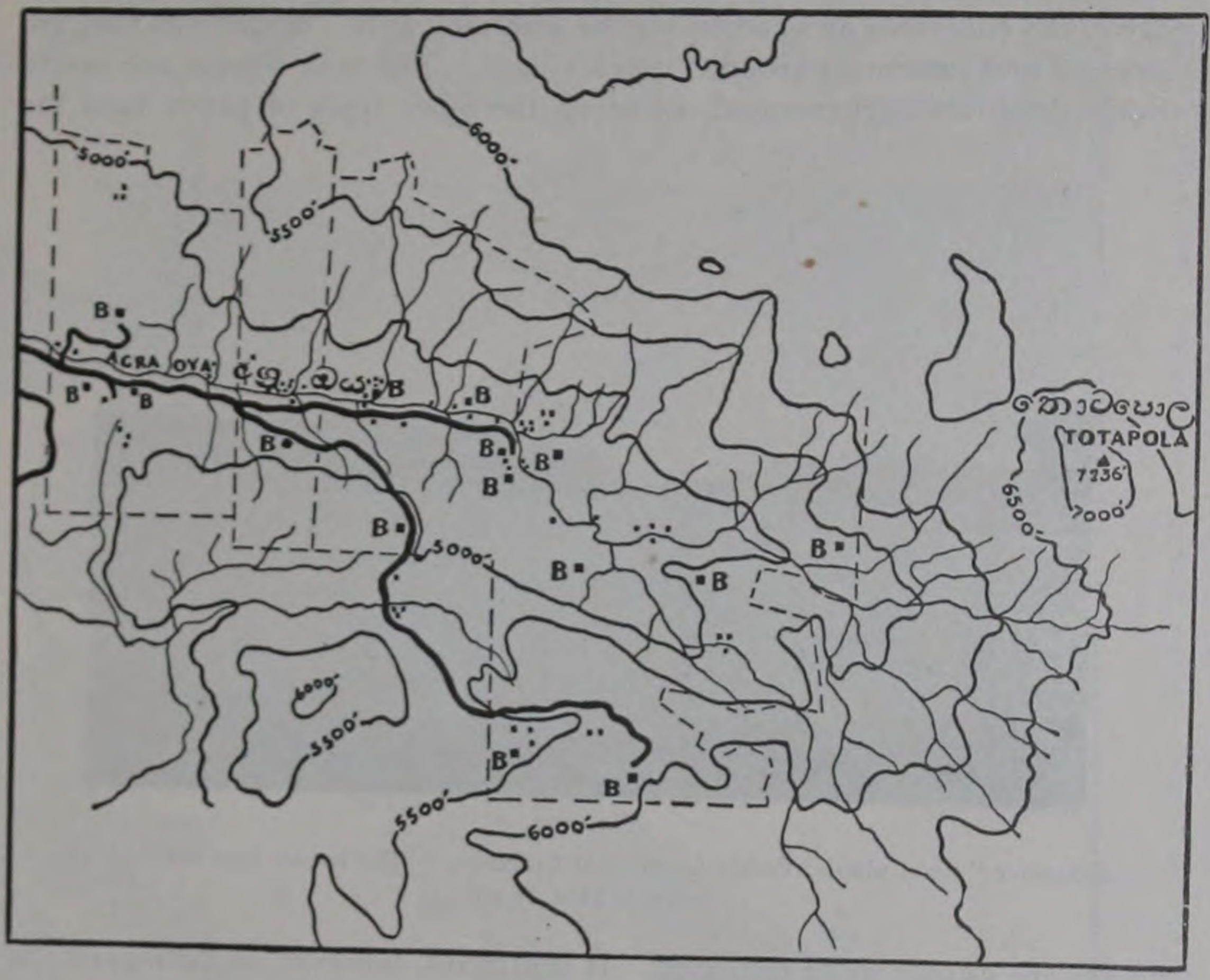

FIG. 101.

Distribution of Dwellings in a Planting District without Paddy Cultivation. Thickest black lines are roads. Dotted lines are estate boundaries. B = planter's bungalow. Trace the contours and colour up the map on the layer system, then add the bungalows.

above the softer soil, on which it would be possible to build houses, and in all these three areas the flood plains are not as fully cultivated as in the more populous western province. Many of these large tracts are owned by wealthy people living in the adjoining towns—*e.g.* on Fig. 103 by wealthy Moorish traders residing in Batticaloa; they pay poorer people to look after

their paddy fields and allow them a small patch of land to grow their own vegetables, etc.

Some of the flood plain paddy lands in region 5 are owned by rich town-dwellers but more are divided between peasant proprietors who live round the edge of the cultivated area, adjoining the land they work. Sometimes they are dispersed and sometimes grouped into a village. The tank villages are nearly always definitely agglomerated, while on the other types of paddy land the

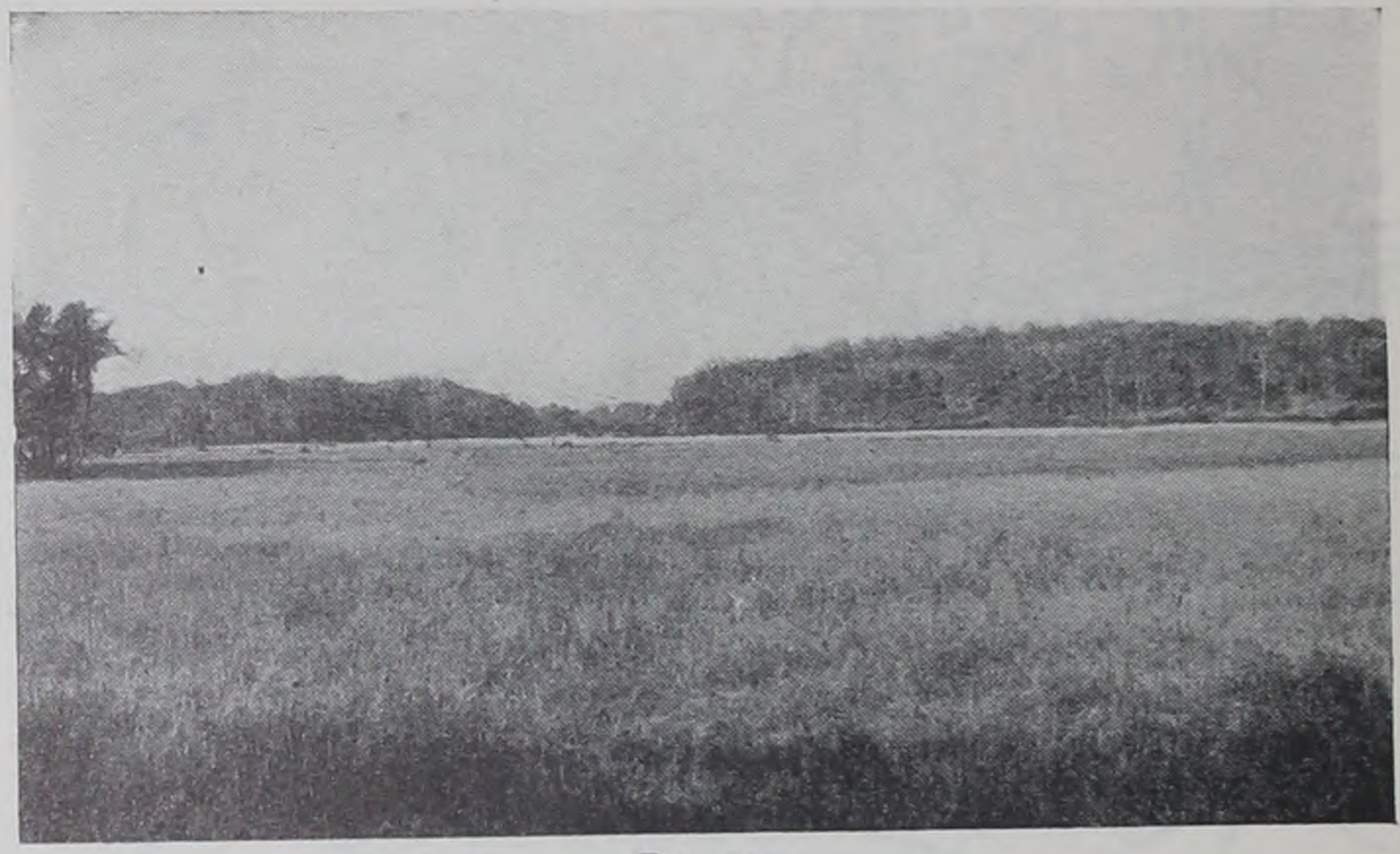

FIG. 102.

Extensive " flood plain " Paddy Lands near Colombo. [The houses near the edge are often hidden by trees.]

houses are usually more dispersed. It is difficult, however, to distinguish the paddy grouping in area 5, because the flood plain paddy lands are interlocked with coconut gardens where the grouping of houses is quite different. Fig. 104 shows a typical portion of area 5. The old town of Madampe was probably the original village of the paddy cultivators, and there would be other houses further to the east, more distributed. Since the railway was built the traders have shifted to form Madampe New Town near the railway. The adjoining land under coconut has the usual dispersal of houses either along the roads or within the plantations, which will be discussed later. It is probable that the paddy lands were developed first and as the jungle was cleared the rest of the

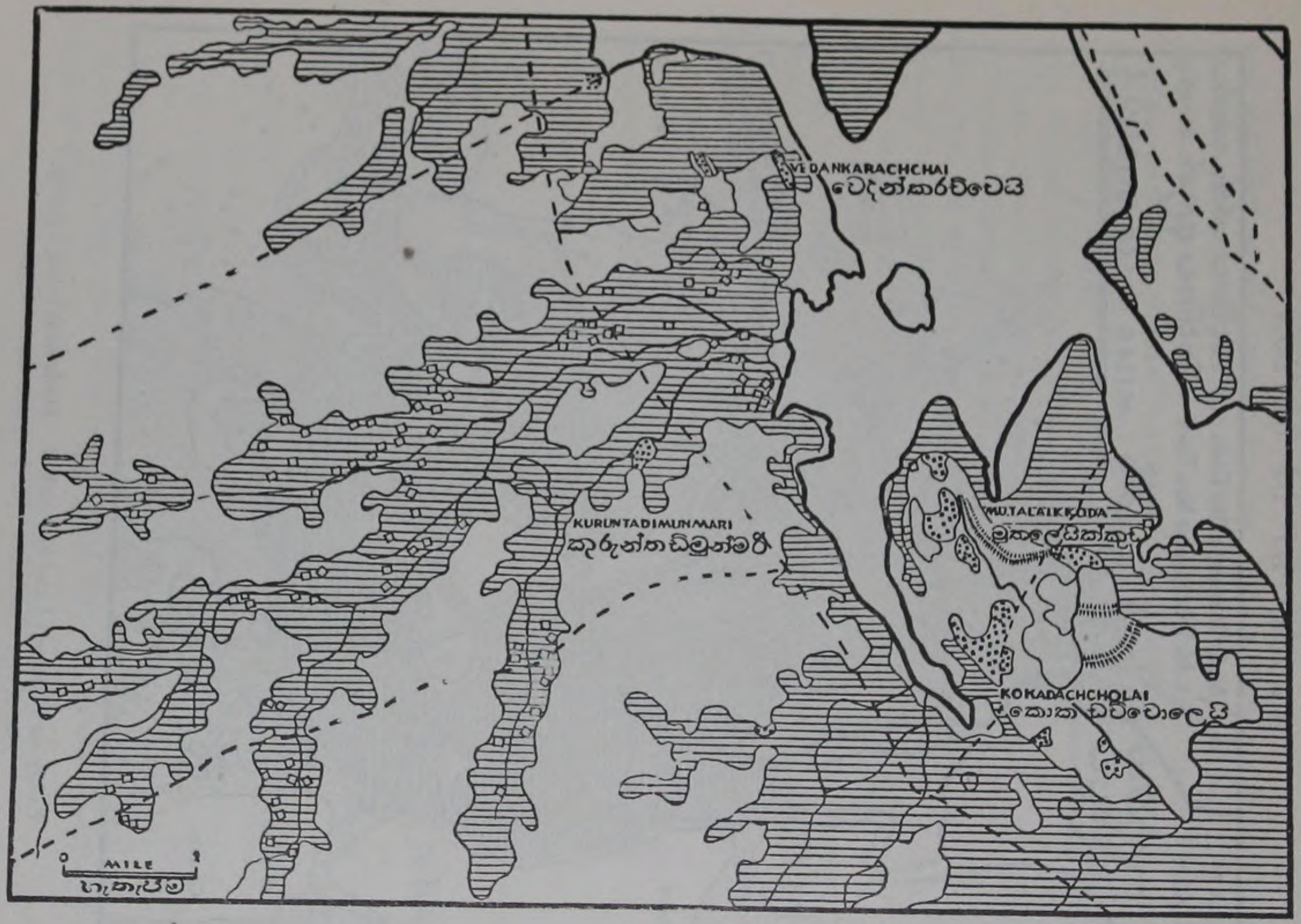

FIG. 103.

"Flood Plain" Paddy Lands near Batticaloa. Horizontal ruling = paddy lands. Dotted lines = roads. Blank squares denote plots of land occupied by tenant farmers.

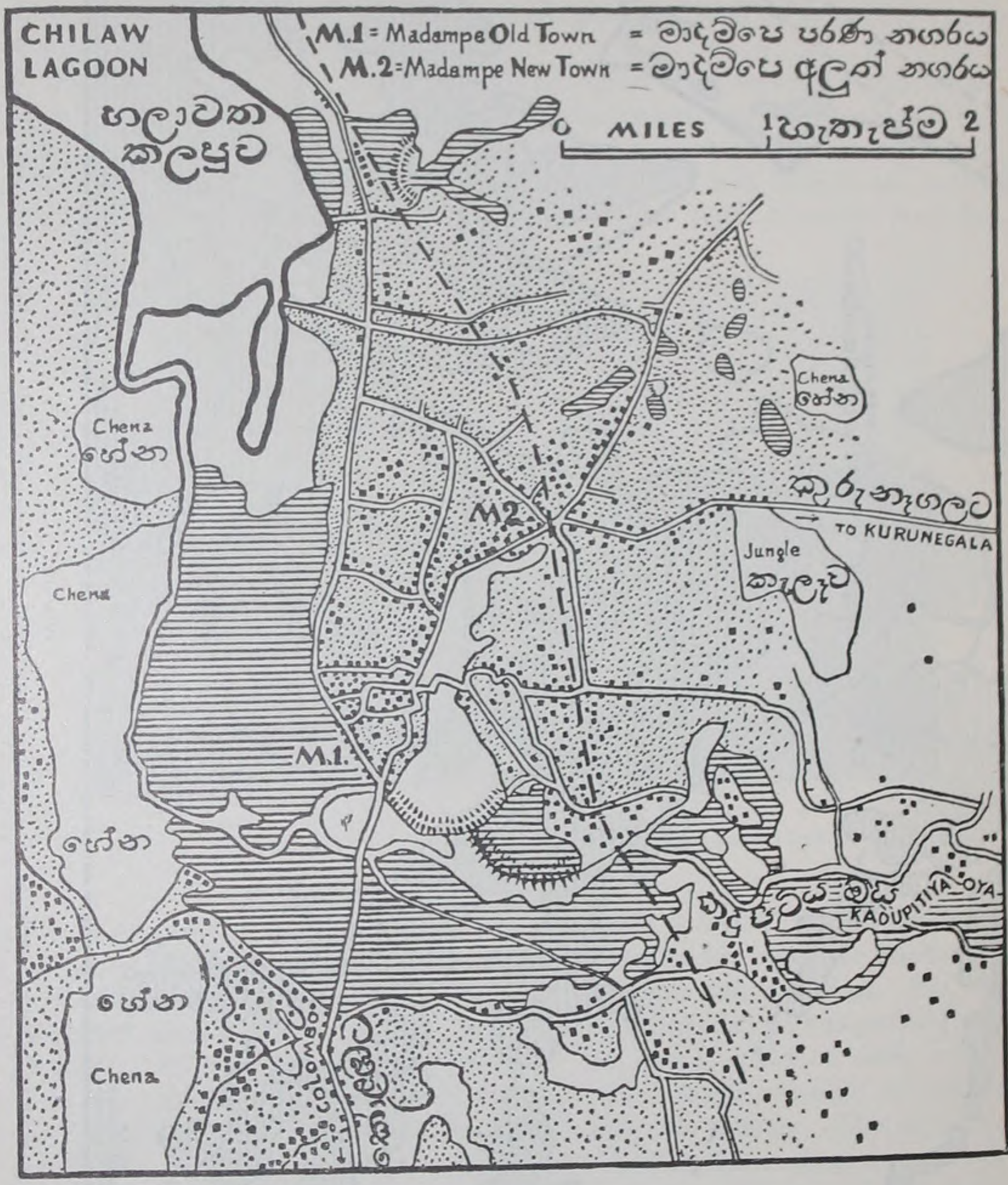

FIG. 104.

Paddy and Coconut Land interlocked. Horizontal ruling = paddy.
Small dots = coconuts. Black squares denote houses.

area was filled up with coconut gardens. Area 5 contains the most densely populated portion of Ceylon and the conditions are very complex. Owing to the system of heritage practised in Ceylon, in which estates are divided equally between the children, the land has become subdivided into smaller and smaller portions, each of which contains a house, so that dwellings are dispersed and as it were "peppered" over the whole area. Some portions have again coalesced when the owners have been obliged to sell out to money-lenders, but the inhabitants often remain to work the land under the direction of the large landowner.

The coastal region contains the most people. Most of them have coconut gardens, the majority being quite small. Those who make a living entirely by the proceeds of their coconut gardens are usually very poor; some have other sources of income and merely prefer to live near the coast. Many of the richer people have estates up-country, or paddy further inland. Some of the men and women who have small plots go as servants or shop assistants to Colombo or other towns, while those at home look after the coconut garden. A large number of the coastal people, however, are engaged in fishing which also disperses them along the coast.

From Chilaw to Tangalle the houses are practically continuous; here and there they thicken up into a "village" with a little accumulation of shops along the main road. Fig. 105 shows a typical case. The "village" is loosely dispersed along a number of roads, and the name is usually a matter of convenience for administrative purposes, such as for the postal districts. It is very difficult to tell where one village ends and the next begins. Since the days of good communication there has been a tendency to place the houses along the road where possible. (It will be remembered that few modern houses are of any great age.)

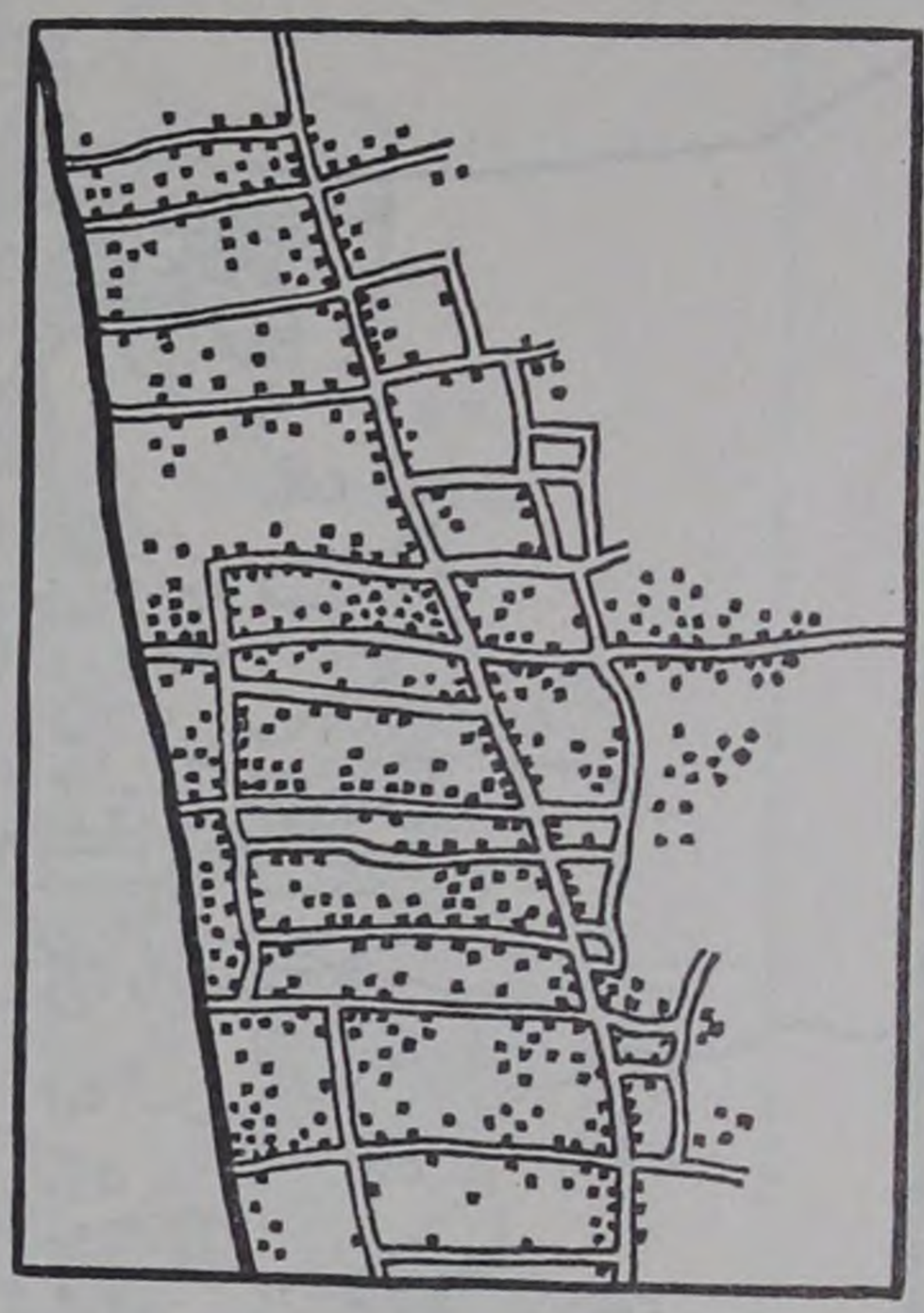

FIG. 105.

Part of the Coastal Region South of Chilaw Lagoon. 1 inch = 1 mile. Ulhitiyawa Village, near Lunuwila. Each house has a small coconut garden, and many people are fishers.

In the southern portion of area 5 there is much more mixed cultivation. The survey map employs the term " native gardens " for the small estates with mixed cultivation. They contain a number of coconuts, but other trees such as limes, mangoes, breadfruit, jak, bananas, as well as chillies, " ladies' fingers,"

FIG. 106.

Mixed Cultivation near Tangalla. Small dots denote "native gardens"; horizontal ruling = paddy; Cit. = citronella plantation; Co. = coconuts. Black squares indicate houses.

pepper, bringalls, and a large variety of fruits and vegetables. Fig. 106 shows a typical area near Tangalle. The houses are dispersed in the same way as on the coconut gardens. Here, however, are some rough pieces of upland not very good for cultivation. These are used up by the villagers for growing citronelle grass, a crop which requires little attention until it is taken in. The absence of houses on the citronelle lands is conspicuous.

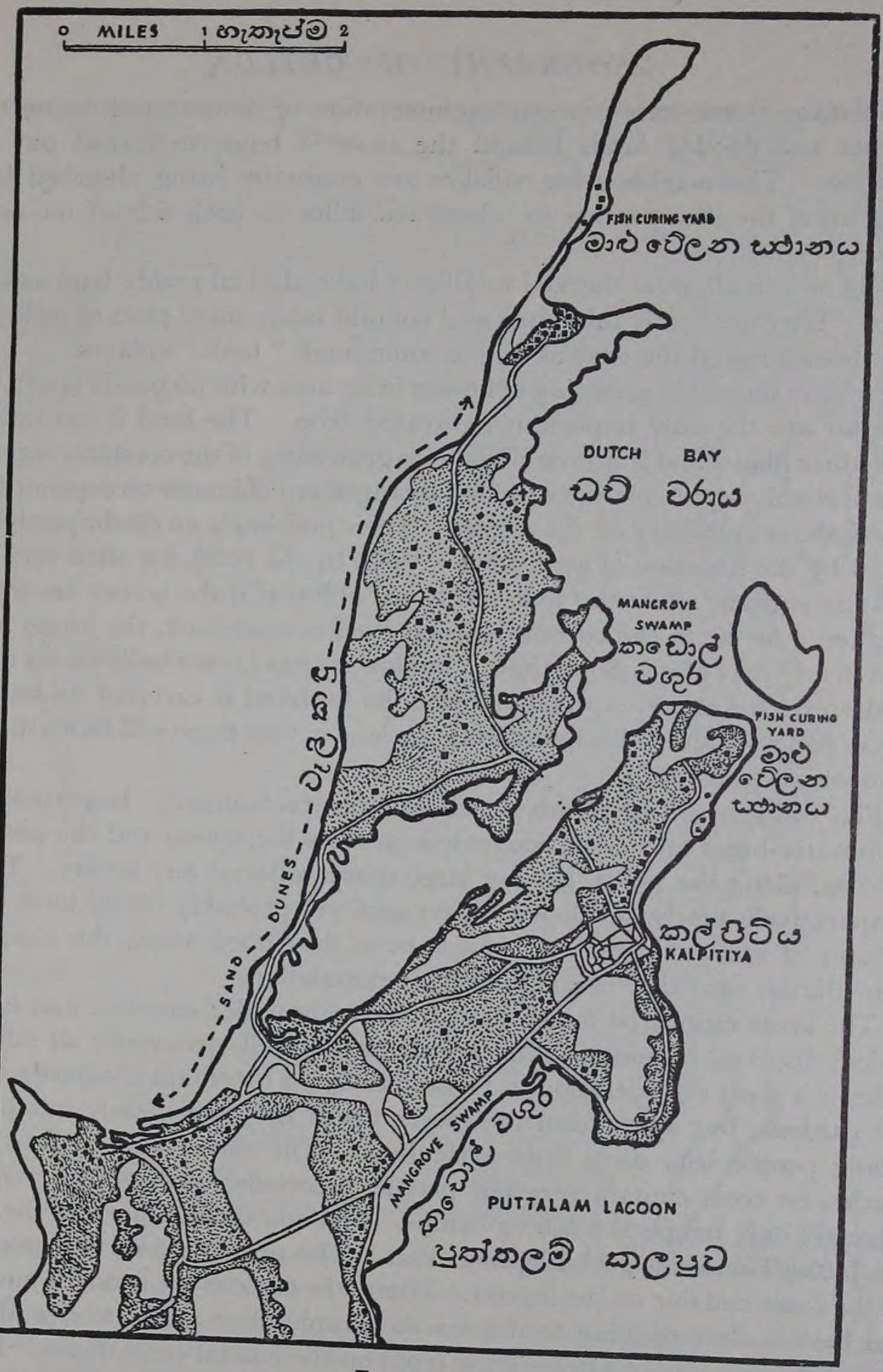

FIG. 107.

Kalpitiya Peninsula. Small dots = coconuts. Black squares denote houses, which are dotted about on the coconut lands.

Colombo forms an enormous agglomeration of houses, and owing to the marshes and flooded lands behind the town it tends to spread out along the coast. The neighbouring villages are gradually being absorbed by the filling up of the thin patches for about ten miles on each side of the original town.

The two small areas marked number 7 have alluvial paddy land as well as tanks. They are thinly inhabited and contain many small plots of paddy with a few houses round the edge as well as some small " tank " villages.

Fig. 107 shows the grouping of houses in an area with no paddy lands, where coconuts are the only important cultivated crop. The land is too sandy for most other plants and it is even difficult to grow some of the common vegetables. This probably represents the original arrangement of houses on coconut land—dotted about anywhere on the estates. Their position is no doubt partly determined by the situation of good wells ; those by the coast are often very saline in sandy regions, while the wells easily get polluted if the houses are too close together. As far as the coconut garden itself is concerned, the house may be built in any part of it. Sometimes a landowner has houses built for his married children on his estate, especially where the husband is carrying on some profession and not gaining his living from the land ; thus there will be a little group of houses on one estate.

Fig. 108 shows a more advanced state of development. Important roads, with motor-buses and other conveniences, cross the region and the people are collected along the roads, leaving large spaces without any houses. This is a comparatively newly developed region and will probably fill up later by subdivision of estates. " Street " towns have developed along the main road. Immediately near the coast is the fishing population.

The areas numbered 8 in Fig. 97 are largely under coconuts and have the typical dispersal of houses. On the islands the wells are nearly all saline and water is a great consideration. Those numbered 9 contain a number of coconut gardens, but apart from the larger towns they are mainly inhabited by fishing people who do a little agriculture. The three small regions on the north-west coast contain very few people, especially north of Mannar, where there are only temporary fishing camps. Fig. 109 shows a piece of the edge of the Jaffna Peninsula near Elephant Pass. The people are in two groups, one on the coast and one on the lagoon. Where the lagoons are good for navigation and have a clear opening to the sea the people often prefer to live along the lagoon as they cannot always grow crops on the coastal sand dunes. Fig. 110

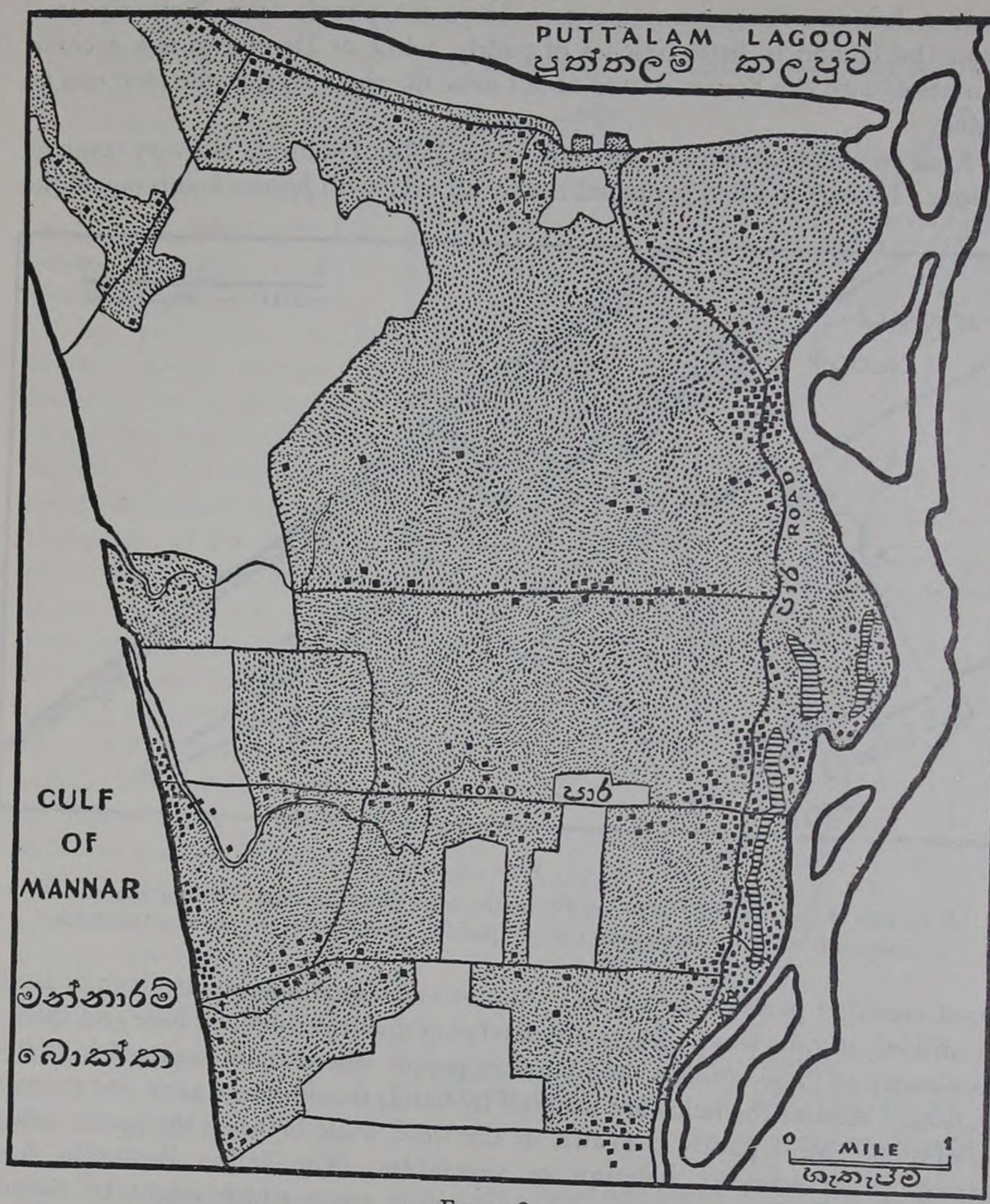

FIG. 108.

Coconut Land South of Puttalam Lagoon, showing marked grouping of houses along roads and development of small street towns. Fishing population along coast. Small dots denote coconut gardens, horizontal ruling denotes paddy land, black squares are houses.

shows a fishing village on a lagoon. Here the people from Komariya sail across the lagoon to little patches of paddy, while at Demitawa is a coconut plantation with the houses dotted about near the shore so that the men can go fishing.

Area 10 which constitutes the bulk of the Jaffna Peninsula is a very complex region. Like area 5 it is peppered nearly all over with houses and is one of the

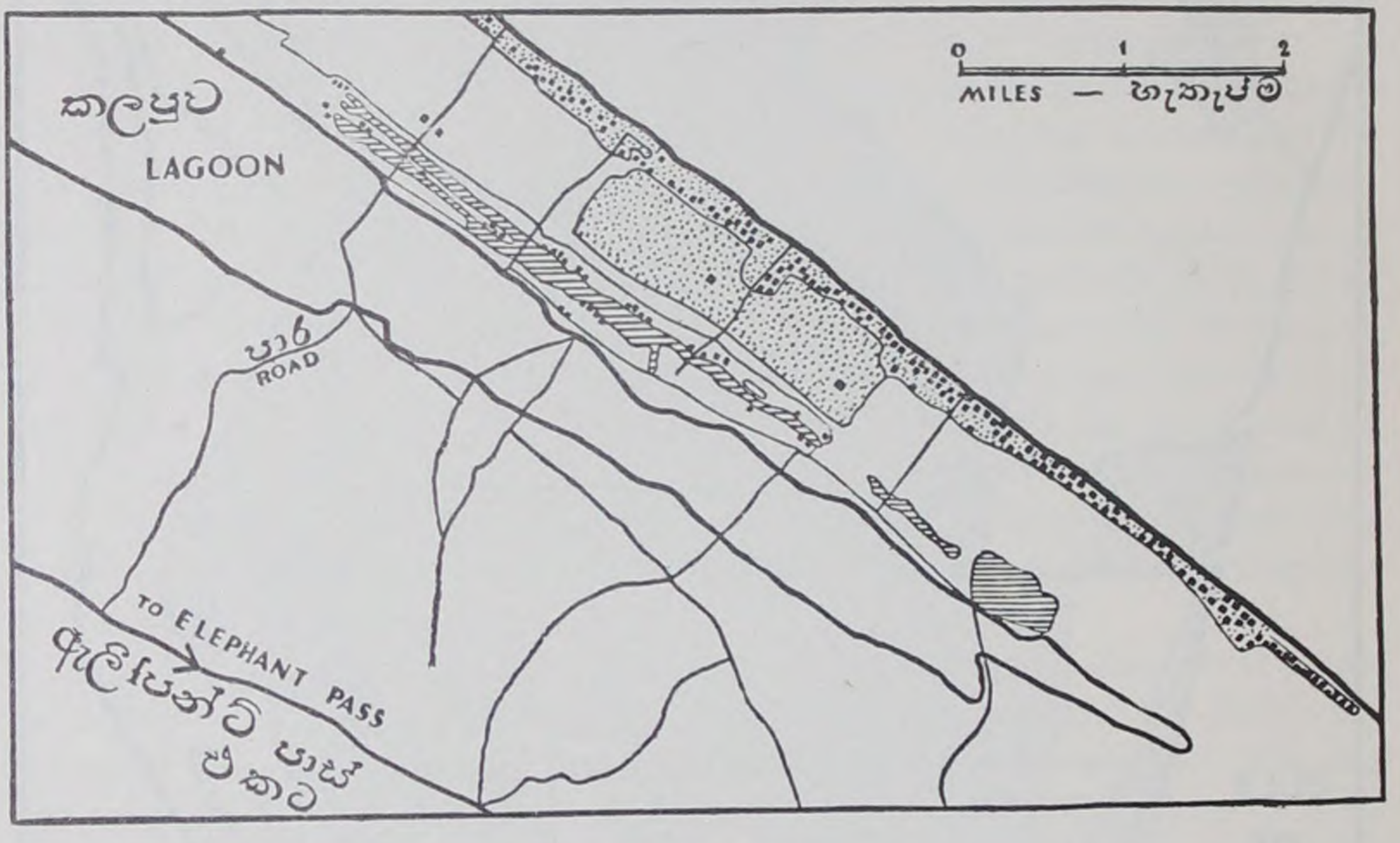

FIG. 109.

A Portion of the east edge of Jaffna Peninsula, near Elephant Pass. Fishing population on coast and lagoon. Horizontal ruling = paddy. Small dots = coconuts or palmyra.

most crowded parts of the island. Almost every available square inch of land is utilised in some way. There are patches of uncultivable land here and there, but many of these contain the houses of people who are not engaged in cultivation. Most of the fields are watered by hand, though there are a few storage reservoirs. Most paddy is grown in the west, while between the paddy fields are crops of tobacco, palmyra or vegetables. The Jaffna Peninsula has here and there a curious network of winding roads which might be called a town. On the whole there seems to be a settled tendency to build houses along roads. Many of the small winding roads are of great age, but even the

new arterial roads recently built by the British Government to cut across the peninsula, *e.g.* Jaffna town to Kankesanturai are now completely lined with houses. Even the more modern railway track has an almost continuous following of houses. Fig. 111 shows a portion of the west of the peninsula. It is mainly chosen because it contains one of the smaller of the thickened patches of houses. Very large patches spread out round Jaffna and south-west of Point Pedro, where the conditions are more complicated. Considering the closed nature of the average Tamil dwelling it is surprising how many are built right on the road. The actual number of houses greatly exceed those shown on the map. Jaffna Peninsula, is, of course, an area in which people live exceptionally frugally and manage to subsist on very small estates, utilising all sorts of small means of adding to their income. When the Jaffna man goes out to Colombo his hard-working habits stand him in good stead and he often becomes very rich, in which case he will usually retire to his native region ; so that the population is somewhat mixed.

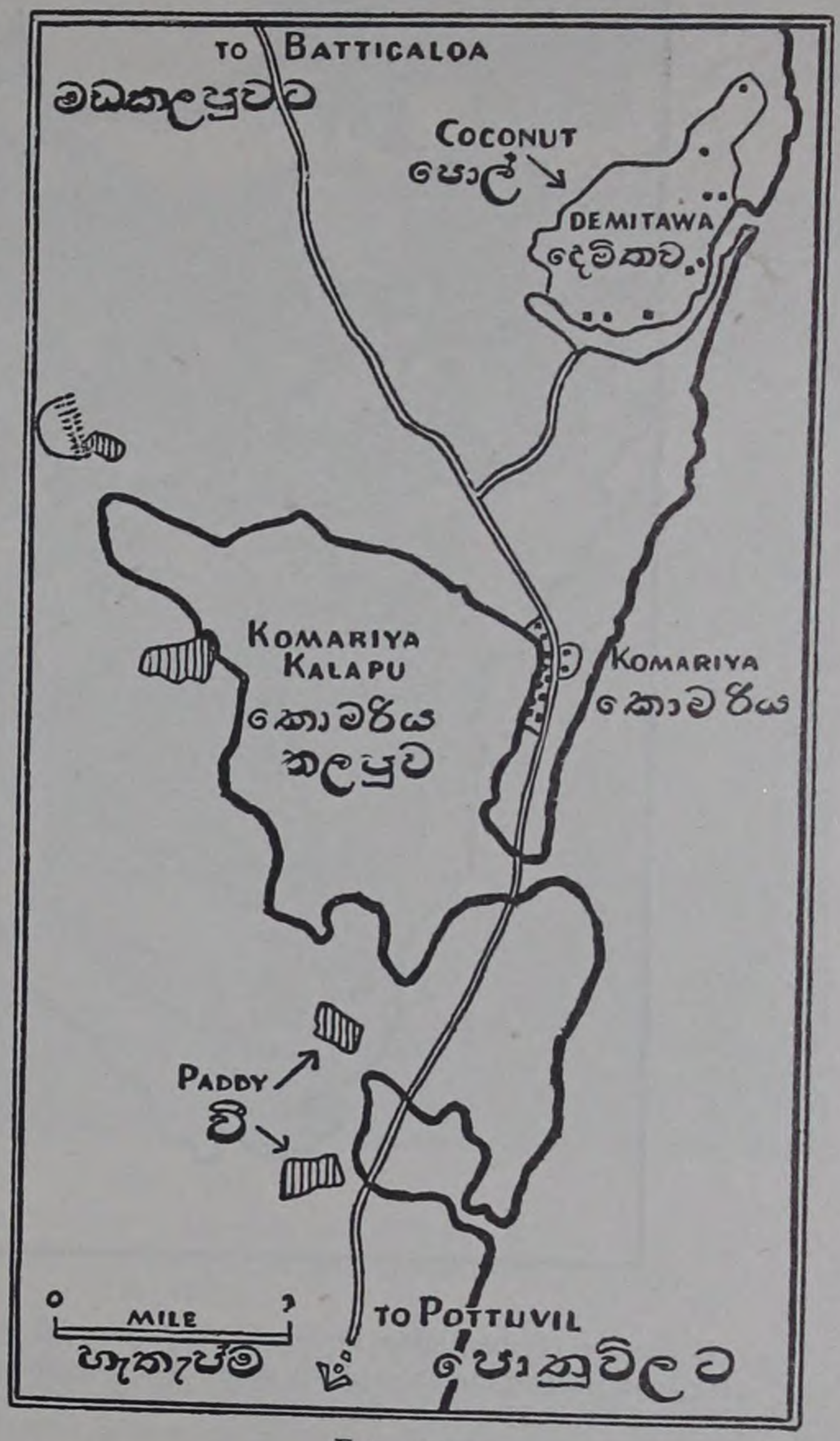

FIG. 110.
Small Coastal Settlements, North of Pottuvil.

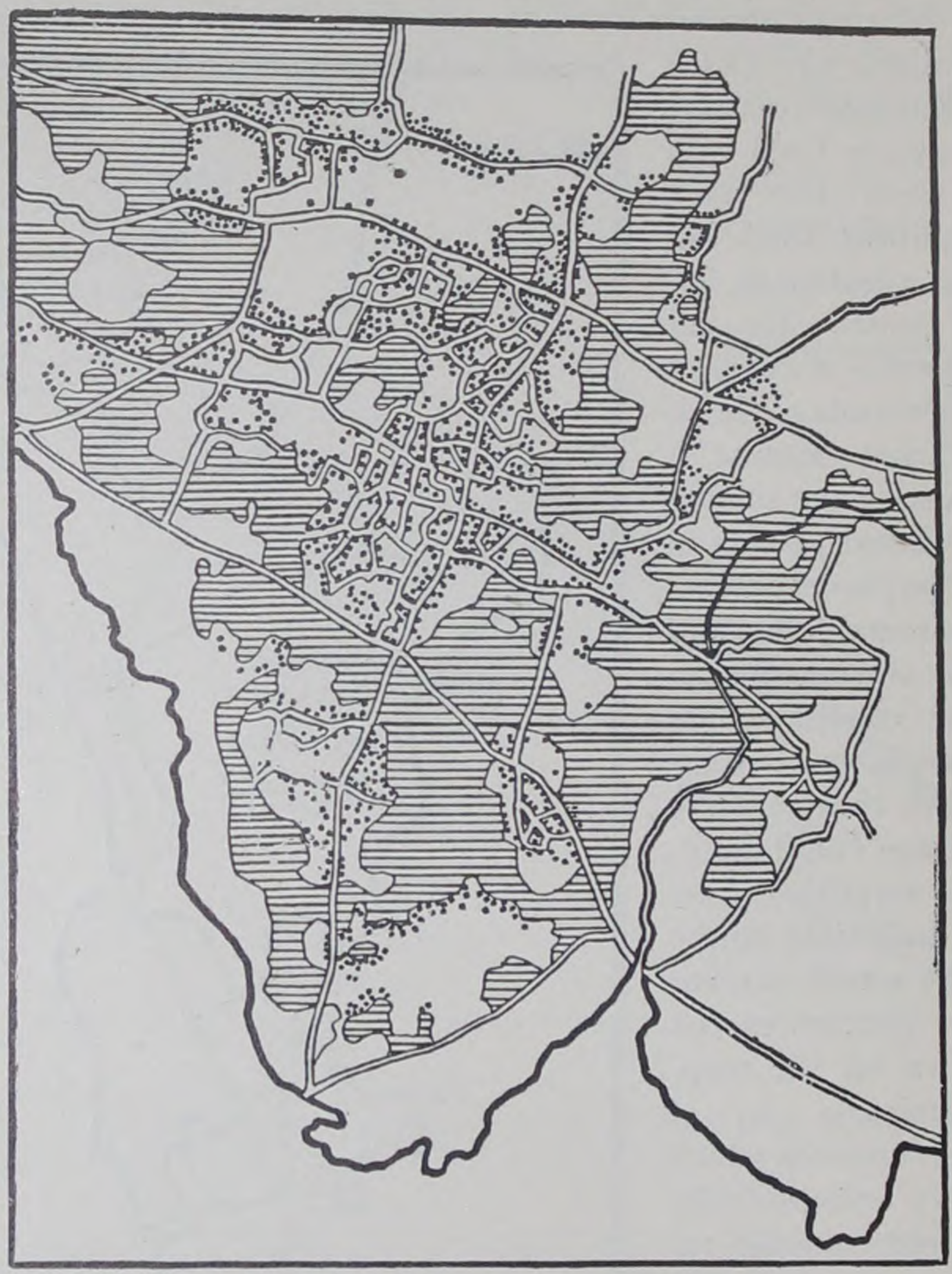

FIG. 111.

A Portion of the Jaffna Peninsula, including W. Arali and Vaddukodai Villages. Horizontal ruling indicates paddy land. The remaining land is cultivated for palmyra, tobacco, vegetables, etc. Scale approx. 1 mile = ¾ inch. Black squares denote houses. Double lines are roads.

Some of the latter people have invested in coconut plantations in region 8 on the peninsula or in paddy on the mainland.

The town types represented in Ceylon are not very varied. The most

important type is the small market centre whose original nucleus is the village street, and hence called by English geographers the " street " town. Many of these have an open market place where people from the surrounding district may come to sell their produce. These markets are usually held only on one

FIG. 112.

Matale Main Street. A typical " street " town with many Tamil and Moorish traders. Note curved surface of road to drain off water, and open drains in front of the shops.

day, or in the case of larger towns on several days, of the week. In recent years closed market halls have been built on the open spaces so as to protect the goods from destruction by rain. There is not usually, however, any market square of a definite pattern surrounded by important buildings as we find in so many European villages. The " street " of shops is merely interrupted by an open space which does not appear to influence the structure of the town or village very much. Sometimes a large town has double streets, as in Matale. If the

town is at a junction of several routes, *e.g.* Kurunegala, the shops and offices extend for some distance along each important road out of the town. In such a town the Katchcheri buildings are often placed at the junction of the roads on an open space.

Unlike the cathedrals of European towns, which usually occupy an imposing position on the market place, the temple is not as a rule a striking feature of the town. There are a few notable exceptions like Kandy, Anuradhapura and Badulla, but as a rule the temple is placed in a secluded position, often just outside the town ; this is for obvious reasons connected with the Buddhist religion, especially because the priests desire both solitude and silence for their religious practices.

Many of the ports differ greatly from the inland towns because they are built on rocky headlands where there is deep landing. The nature of their site requires that the town shall fit into the natural features, and hence the ports like Galle, Beruwala or Tangalla have their buildings irregularly grouped.

Europeans have had a distinct influence on the grouping of houses in Ceylon. The trade which they created caused a definite enlargement of the towns ; this is paralleled in most countries of the world in recent years as world trade has developed. The actual influence upon the town is usually two-fold. It creates a number of large office buildings and large residences of wealthy merchants on the one hand, while on the other hand a very squalid quarter usually develops ; in the latter houses are rapidly thrown up to accommodate the very poor people who come from the homes of poor farmers and are attracted by the apparently high wages offered for work about the port. The accumulation of such people in a crowded quarter is a danger to the whole community in a hot country. They are deprived of their wells, and the sanitary arrangements which are satisfactory in a village are quite unsuitable in such a crowded quarter. The people get insufficient fresh air, are often very unhealthy, and epidemics break out. The death-rate is very high in these quarters ; children are born under dirty conditions and a greater proportion of them die in infancy than in the villages. Large towns are not an unqualified advantage in hot countries and the squalid quarter of a port is an even greater menace to the rest of the country than in the temperate zone. The greatest advantage of a large town arises out of the possibilities in the development of educational facilities owing to the larger number of people ; this undoubtedly draws a great many people into Colombo, Kandy, Galle and Jaffna. The transfer of the new

university from Colombo to Peradeniya, near Kandy, will possibly draw a number of people away from Colombo.

The British have paid much attention to the development of roads and railways. This has affected the distribution of settlements to a great extent. Some towns have been created by the railways—*e.g.* Nawalapitiya for railway

FIG. 113.
A P.W.D. Labour Settlement.

works, or Nanu Oya as an important junction. Others have merely slightly shifted their position to be near the railway or have developed a new quarter close to the station, *e.g.* Katugastota, Moratuwa, etc. Similarly, the use of motor-buses on the roads has added to the importance of places which are the starting point of a number of services, *e.g.* Gampola. Reference has already

been made to the new settlements formed by the Public Works Department along the main roads.

Many town-planning schemes are being considered at the present day, especially for Colombo, which has many difficulties connected with its development owing to the area liable to floods behind the town, and also to the exceptional squalor which has developed in the neighbourhood of the harbour ; no doubt many changes will occur there in the near future.

PART V

SUMMARY

CHAPTER 1

THE NATURAL REGIONS OF CEYLON

Ceylon is politically divided into nine Provinces, the boundaries of which have been settled partly by natural features, such as rivers, and partly by considerations relating to convenience of administration. A description of each of these provinces separately would be unnecessarily complicated, and would involve a good deal of repetition, since their boundaries often cut through regions having similar natural conditions. For purposes of geographical study it is much more convenient to divide the island into a series of natural regions in which a number of the physical and other conditions are similar. The greater part of this book has been occupied by an analysis of the various features of the physical and human geography. It now remains to collect up the results of this analysis so as to gain a perspective view of the island as a whole and to see what human activities are distinctive of the various areas having similar natural conditions. On completing the study of this chapter, the student is advised to compare the map of Natural Regions with the map of Political Regions [page 39].

In order to make a map of Natural Regions it is necessary to pass in rapid review and compare the maps showing the distribution of the physical and other important features; the most important are as follow: Structure (*i.e.* Geology), Relief, Annual Distribution of Rain, Seasonal Distribution of Rain, Temperature, Vegetation, and Races. If the facts were all represented upon transparent maps, on placing them one above the other, it would be found that in certain regions a series of conditions would coincide; if not all the conditions, at any rate a large proportion of them. The greater the number of conditions which coincide in one area, the more distinctive it is, as a rule, from the human point of view. The study of the map of Natural Regions makes it easier to see

why human activities vary in different parts of the island, and how far man is influenced by his physical environment.

If the necessary maps are passed in rapid review, the following facts emerge :

(1) Structurally, the island is remarkably uniform, and would tend to form a single unit on account of the uniform character of its crystalline rocks. Only one small portion of the island, the limestone plain of the north-west, separates itself off distinctively from the main mass. This fact is certainly reflected in the human geography of the island. The separation of the Jaffna Peninsula is strongly marked, while in spite of the racial differences which exist, in the rest of the island there is a certain uniformity in the mode of life which is the result of the similarity in soil, mineral resources, and water circulation, which are a direct result of the nature of the crystalline mass.

(2) In Relief, the island divides itself into three main regions : (*a*) the Coastal Lowlands, (*b*) the Interior Lowlands and Uplands, and (*c*) the Hill Country ; the latter is greatly subdivided by the various mountain ranges into a number of areas which are more or less distinctive on account of their isolation. These regions are shown in the diagram analysis of the hill country.

(3) The Mean Annual Rainfall map subdivides the country into five main regions, as follows : (*a*) and (*b*) the areas of deficient rainfall, near Puttalam and Hambantota, where the precipitation is under fifty inches a year, (*c*) the northern and eastern lowlands, where the rainfall is less than seventy-five inches and irrigation is necessary (these three form what is commonly known as the " dry zone "), (*d*) the area of plentiful rainfall within the seventy-five inch isohyet, and (*e*) the area of excessive rain, in the Adam's Peak district, bounded by the isohyet of 150 inches.

(4) The Seasonal Distribution of Rain further subdivides these districts. The dry zone is subdivided into two : (*a*) the north and east coastal region having most of its rain in one season, (*b*) the remaining portion, having two periods of increased rainfall. The wet zone is also subdivided, as follows: (*a*) the lowlands with a double maximum, (*b*) the highlands dominated by the south-west monsoon, (*c*) the highlands dominated by the north-east monsoon, and (*d*) the highlands with three periods of increased rainfall.

(5) The Temperature map divides the island into (*a*) the distinctly cooler areas of the hill country, where the average is less than 75° F., (*b*) the warmer lowlands.

(6) The Vegetation map does not give very distinctive divisions. It is quite possible that without cultivation the greater part of the island would be clothed

with equatorial forest, only differing in quality according to the rainfall. The drying of the surface consequent on the removal of forests has tended to accentuate the differences in vegetation in the drier regions. There are a few areas, however, which are remarkable on account of their lack of forests. These are as follow : (*a*) the Jaffna District, which tends to develop thorn and scrub vegetation on account of its subsoil of permeable limestone ; (*b*) the dry regions near Puttalam and Hambantota, which also tend to develop scrubland ; (*c*) the talawa country ; and (*d*) the patana country. In most of these cases the variation is mainly due to causes connected with either Structure, Rainfall, or Temperature.

(7) The Distribution of Races also has a strong effect upon regional individuality. The fact, for instance, that the Jaffna limestone district is mainly inhabited by Tamils helps to emphasise its separateness from the rest of Ceylon. The Race map gives three very broad divisions into the regions inhabited by (*a*) Low-Country Sinhalese ; (*b*) Up-Country Sinhalese ; and (*c*) Ceylon Tamils. Race is not, however, so fundamentally important as Structure, Relief, and Climate. The residents of one race in a certain area, by creating a series of human factors, will tend to emphasise its individuality.

Another feature which some authorities consider should be taken into account in constructing a map of Natural Regions is the accessibility of areas and their position in relation to important human centres in surrounding countries. Accessibility, is, however, usually the result of Relief. The hill country of Ceylon is always more or less isolated and individual in character, on account of its inaccessibility ; whilst round the coast there are isolated regions whose human development depends upon their accessibility by sea.

A map of Natural Regions is intended to be in the nature of a summary. Its educative value is mainly in the process of construction of the map. Inasmuch as the opinion of different geographers as to the relative importance of certain factors may vary, it is not comparable with a Fixed Distribution map, *e.g.* of rainfall or temperature. The following map of the Natural Regions of Ceylon is not to be considered as in any way final, but only suggestive, and summarising the views of the author as to the grouping of the various features. The student should break off at this point and try to construct a map of his own by surveying the available data in the manner suggested above. The following notes summarise the leading features of the regions marked in the map.

(1) **The South-Western Lowlands** are nearly everywhere under 600 feet, a large porportion of the area being nearly at sea-level. The crystalline rock is

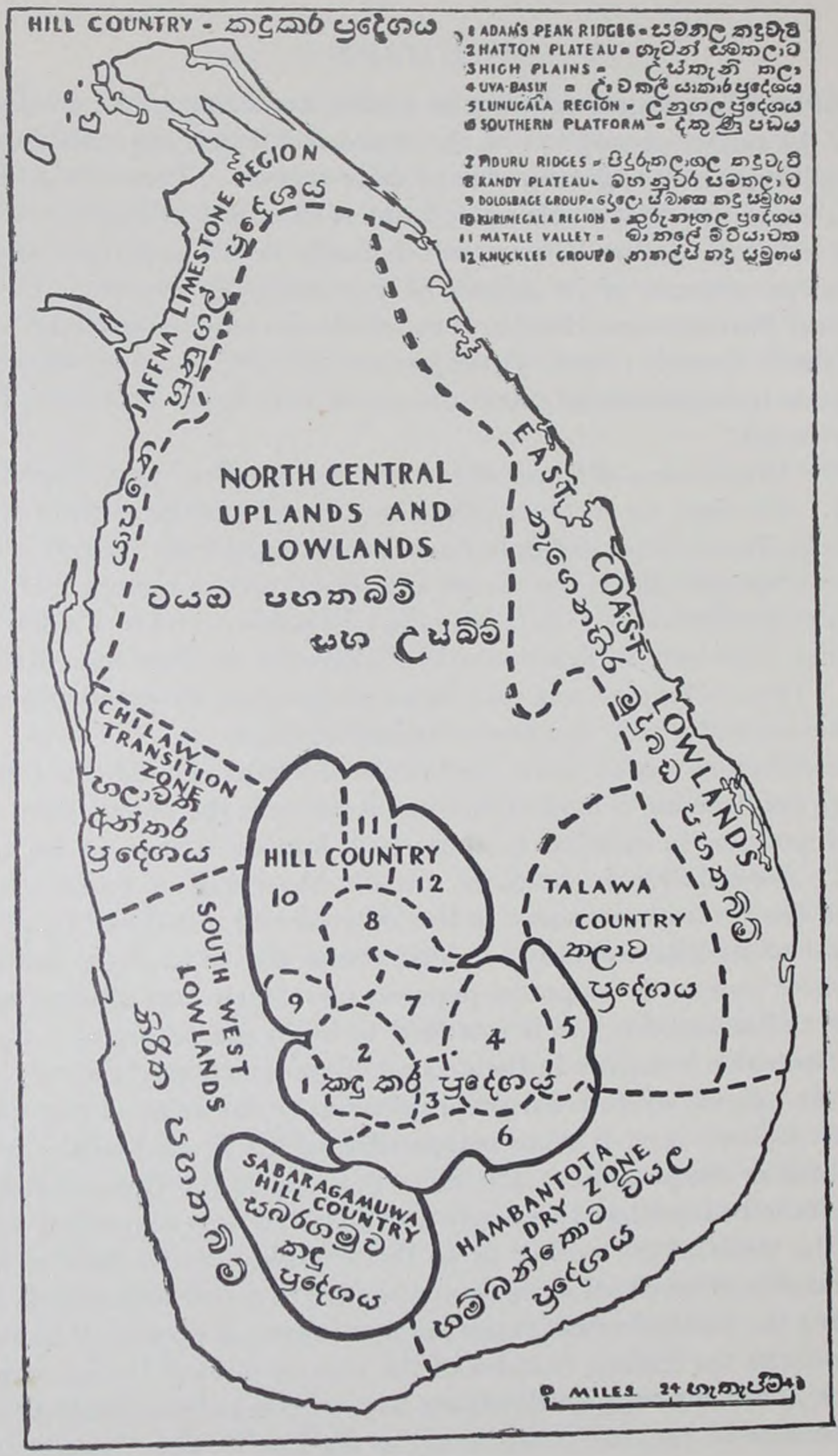
HILL COUNTRY - කඳුකර ප්‍රදේශය
1 ADAM'S PEAK RIDGES = සමනල කඳුවැටි
2 HATTON PLATEAU = හැටන් සමතලාව
3 HIGH PLAINS = උස්තැනි තලා
4 UVA-BASIN = ඌවකලී යාකාර ප්‍රදේශය
5 LUNUGALA REGION = ලුනුගල ප්‍රදේශය
6 SOUTHERN PLATFORM = දකුණු පඩිය
7 PIDURU RIDGES = පිදුරුතලාගල කඳුවැටි
8 KANDY PLATEAU = මහනුවර සමතලාව
9 DOLOSBAGE GROUP = දෙලොස්බාගෙ කඳු සමූහය
10 KURUNEGALA REGION = කුරුණෑගල ප්‍රදේශය
11 MATALE VALLEY = මාතලේ මිටියාවත
12 KNUCKLES GROUP = නකල්ස් කඳු සමූහය
JAFFNA LIMESTONE REGION - යාපනය හුණුගල් ප්‍රදේශය
EASTERN COASTAL LOWLANDS - නැගෙනහිර වෙරළබඩ පහතබිම්
CHILAW TRANSITION ZONE - හලාවතින් අන්තර ප්‍රදේශය
NORTH CENTRAL UPLANDS AND LOWLANDS
වයඹ පහතබිම් සහ උස්බිම්
HILL COUNTRY
කඳුකර ප්‍රදේශය
SOUTH WEST LOWLANDS - නිරිත දිග පහතබිම්
TALAWA COUNTRY - තලාව ප්‍රදේශය
SABARAGAMUWA HILL COUNTRY - සබරගමුව කඳු ප්‍රදේශය
HAMBANTOTA DRY ZONE - හම්බන්තොට වියළි ප්‍රදේශය
0 MILES 24 - 0 සැතපුම් 24

FIG. 114.

The Natural Regions of Ceylon.

covered with a thick layer of kabouk as well as vast alluvial deposits formed in the large flood plains of the rivers. Blown sand veils the surface for some distance inland. The south-west monsoon is strongly felt along the coast, and increases the rainfall. The annual rainfall is between 75 and 150 inches, and there is a marked increase at the equinoxes. There is an excess of water everywhere ; floods are common, and drainage is an important problem. The area is almost entirely under cultivation, the chief crops being coconuts, which cover a large porportion of the area, especially on the blown sand near the coast, the various fruits and vegetables of domestic gardens, paddy, rubber, and cinnamon. It is the most densely populated part of the island, the people being very evenly spread. The biggest towns are near the mouths of the most important rivers or lagoons, and include Colombo, Negombo, Panadure, Kalutara, Bentota, Ambalangoda, Galle, Matara, and Tangalla. The location of population in this part of the island is largely due to European influence, and especially to the momentum exerted by Colombo, which has developed into a centre of world trade during the last three hundred years. The other coastal towns have all been connected with European trade, Indian trade, or coastwise sailing. Galle, Matara, Kalutara, and Negombo had most to do with the Dutch and also with the Portuguese ; the influence of both nations can be traced in these towns. They now carry on a small trade with India and have little to do with world traffic. Beruwala has long been associated with the trade of the Coast Moors. The fishing along this coast is also very important. Inland there are no towns of any size, a series of small village market centres, such as Veyangoda, Gampaha, Udugama, Elpitiya, Baddegama, being more or less evenly spread over the whole area.

The region has an essential unity on account of its uniform appearance, due to the prevalence of the coconut palm, and a great uniformity in human conditions, on account of its almost exclusive occupation by one type of people, Low-Country Sinhalese. Colombo and its immediate neighbourhood might almost be cut off as a separate Natural Region because it is so different from anything else in Ceylon. The growth of British shipping, together with the rapid rise of the tea and rubber trade, has caused an enormous concentration of population in the neighbourhood of the chief port, and the human conditions which exist in this area are entirely different from those in any other part of the island. It has also a certain amount of separateness from the rest of the island because it is the focus of European influence. In the days of sailing ships when smaller harbours could

be used, Europeans entered at ports all round the coast, and the history of the island might have been very different if these conditions had remained. The invention of large steamships necessitated the construction of commodious and expensive harbour works, which were naturally not possible at all the points of European contact ; so that traders discontinued their visits to ports like Galle Batticaloa, Trincomalee and Negombo, and directed their ships towards one focal point. Colombo had no proper harbour and was only a landing place for Moorish sailing vessels until it was settled by Portuguese traders, who obtained permission from the King at Kotte to build a trading station. They took advantage of this permission to build a fort, the site of which is still the nucleus of the town as a trading and Government centre. The inhabitants of Colombo, having more intercourse with foreigners, have become somewhat differentiated from the rest of the inhabitants of Ceylon. Their economic life is also entirely different, since they provide little of their own food and clothing, and are mainly engaged in trading or administrative and educational work ; they have more use for money, and because the majority of them have no land for growing food they have to be given higher wages—which is one of the main differences between an urban and rural population ; as Colombo is the only large urban agglomeration in Ceylon, it may perhaps be regarded as a distinctive Natural Region. The selection of the site of Colombo by the Europeans was no doubt partly connected with its relation to some of the entrances into the hill country. The approach from Galle was almost impossible, involving the negotiation of the difficult parallel ridges of Sabaragamuwa, and afterwards the high wall of the Adam's Peak Ridge. From Colombo there was an approach via Sitawaka, (the modern Avissawella), the Kelani Ganga Valley and the Ginigathena Pass, as well as the possibility of approach by the Kadugannawa Pass ; it was also a good point for the control of the coast routes to the north towards Mannar and southwards to Galle. All this was probably not known to the early settlers, but as the land became known it was no doubt the reason why Colombo became the administrative capital for each of the three European powers. Its expansion during the twentieth century is remarkable, and corresponds to a similar growth in nearly all the great ports of the world, owing to the increase in the international exchange of commodities. Even disastrous floods which endanger the lives of about 15,000 people do not deter settlement in the immediate vicinity of a port with such good opportunities for trade.

(2) **The Sabaragamuwa Hill Country.** This region presents an extra-

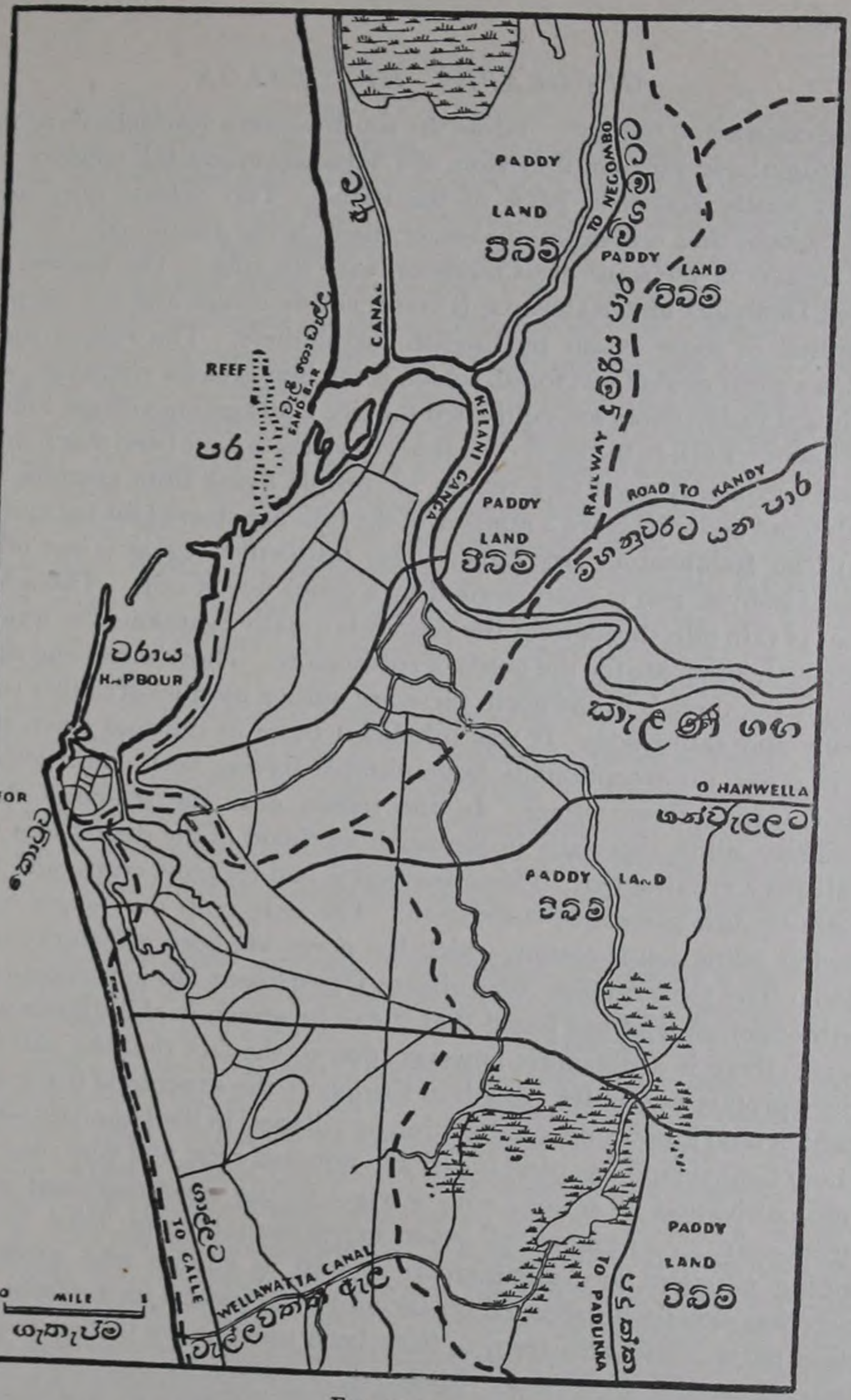

FIG. 115.

The Site of Colombo. Shading in N. and S.E. denotes swamps. Note extensive paddy lands behind the town. Expansion inland is limited by swamps and paddy land of the Kelani Ganga flood plain, hence the town is spreading N. and S. along the coast. All the area between the paddy lands and coast is packed with houses.

ordinary contrast to the last. While the south-western lowlands form the most densely populated portion of Ceylon, the Sabaragamuwa hill country is one of the most lonely and wild parts of the island. The climate does not differ greatly, except that it is distinctly wetter, there being additional relief rain due to the contact of the south-west monsoon with the hills. The highest portion, between Deniyaya and Rakwana, is considerably cooler and has been cleared and settled to some extent by English tea-planters. The rest of the region contains a great deal of wet forest, which is the best area for elephants, and only the alluvial valley floors are cultivated for rice ; straggling villages follow these valley floors. Even in the early days it never seems to have been much inhabited, and was frequently used as a retreat for people flying from enemies. It will probably not be long before a number of the hills are cleared for tea and rubber.

(3) **The Hambantota Dry Zone.** This distinctive region is cut off by the fifty-inch isohyet, and is characterised by a deficiency of rain. Though a small amount of rain falls throughout the year, it is usually evaporated so quickly that it is totally inadequate for the needs of cultivation. Thorn scrub and dry jungle predominate, though in the north there are quite a number of timber trees, such as ebony and satinwood. It was inhabited more in the past when the tanks were in order, an exceptionally large number having been constructed on the Walawe Ganga river system. In the region near the sea-coast the soil is exceedingly saline, especially in the neighbourhood of the depressions in which the salt pans are situated. This saline soil is bad for most crops, and therefore operates against successful cultivation. The only crop that seems to enjoy a somewhat saline soil is cotton, which has never yet been grown extensively in Ceylon. The Government Agricultural Department has experimented in the growth of cotton, and has found that it can be grown in this district with some success ; there is a difficulty, however, due to the fact that the plant tends to produce profuse vegetative growth in Ceylon at the expense of fruiting. Some amount of land is now under cultivation by villagers in the Hambantota District, to whom Crown land has been leased at a nominal rent, and who receive advice on the cultivation of cotton, with a view to the encouragement of interest in this crop. A number of other experimental crops have been tried, including tomatoes at Ambalantota, as well as chillies and ground nuts ; tobacco has also been suggested on account of its success in the Jaffna District. Certain parts of this area seem to have been much more thickly populated in the past than they are to-day. Magama, situated near the coast, a few miles west of Kirinda, was founded during the fourth century B.C., and seems to have

been a place of some importance for a long period, while Tissamaharama is surrounded by three very large tanks, which would support extensive paddy lands, and was no doubt a site of great importance at the time when the remarkable stupas and temples were built. There is a tradition that the road down to Tissamaharama from Uva, was so thickly lined with houses that it was possible for a cock bird to travel along it by hopping from roof to roof. At present the human activity in this region is separated into two distinct currents. Hambantota and the adjacent coastal lands are associated with a very ancient salt trade and with the fishing off the coast. The port itself is also connected with the ancient system of coastal trading. It is one of a series of small ports round the coast, which are separated by about a day's journey by small sailing vessels. It is the nearest good harbour to Magama and Tissamaharama. The second current of life in this region is along the pilgrim route to Kataragama. The main road from Wellawaya, constructed by the Government, is paralleled by the much-frequented and more ancient jungle road from Buttala. The traffic on these roads is, however, limited to a comparatively short portion of the year, during June, July and August. Small traders make temporary boutiques along the road during the pilgrim season, but in other parts of the year the place is almost deserted. A good deal of the land in the valley of the Kambukkan Oya is now uninhabited, has very few traces of former occupation, and comparatively few tanks. To the west of Tissamaharama there are many more villages, and the population steadily increases near the Walawe Ganga ; in this district there are a number of tanks now in use. The region as a whole is very thinly populated.

(4) **The Eastern Coast Lowlands.** This region constitutes a narrow strip, varying from about ten to thirty miles in width, and stretching from the neighbourhood of Pottuvil to Mullaittivu. The land is everywhere exceedingly flat, especially near the coast, and the rivers spread out into large lagoons, which in parts approach one another very closely. Within a distance of about five miles from the coast there is an almost continuous series of stretches of water alternating with swamps, where the land is practically at the water level. The Mahaweli Ganga discharges itself into the sea near the middle of this region. It winds about over the coastal flats and divides up into innumerable streams. There are two main outlets for the water ; one enters Koddiyar Bay opposite Trincomalee, while the other strikes out almost at right angles and enters the sea about half way between Elephant Point and Foul Point. Koddiyar Bay, with its various ramifications, including Trincomalee Harbour and Tamblegam

Bay, forms one of the finest natural inlets in the world ; but in spite of its position at the mouth of the biggest river in Ceylon, and its excellence as a harbour, the swampy land in its immediate neighbourhood has hampered its development. The site of Batticaloa, which is at the exit of a long series of connected lagoons

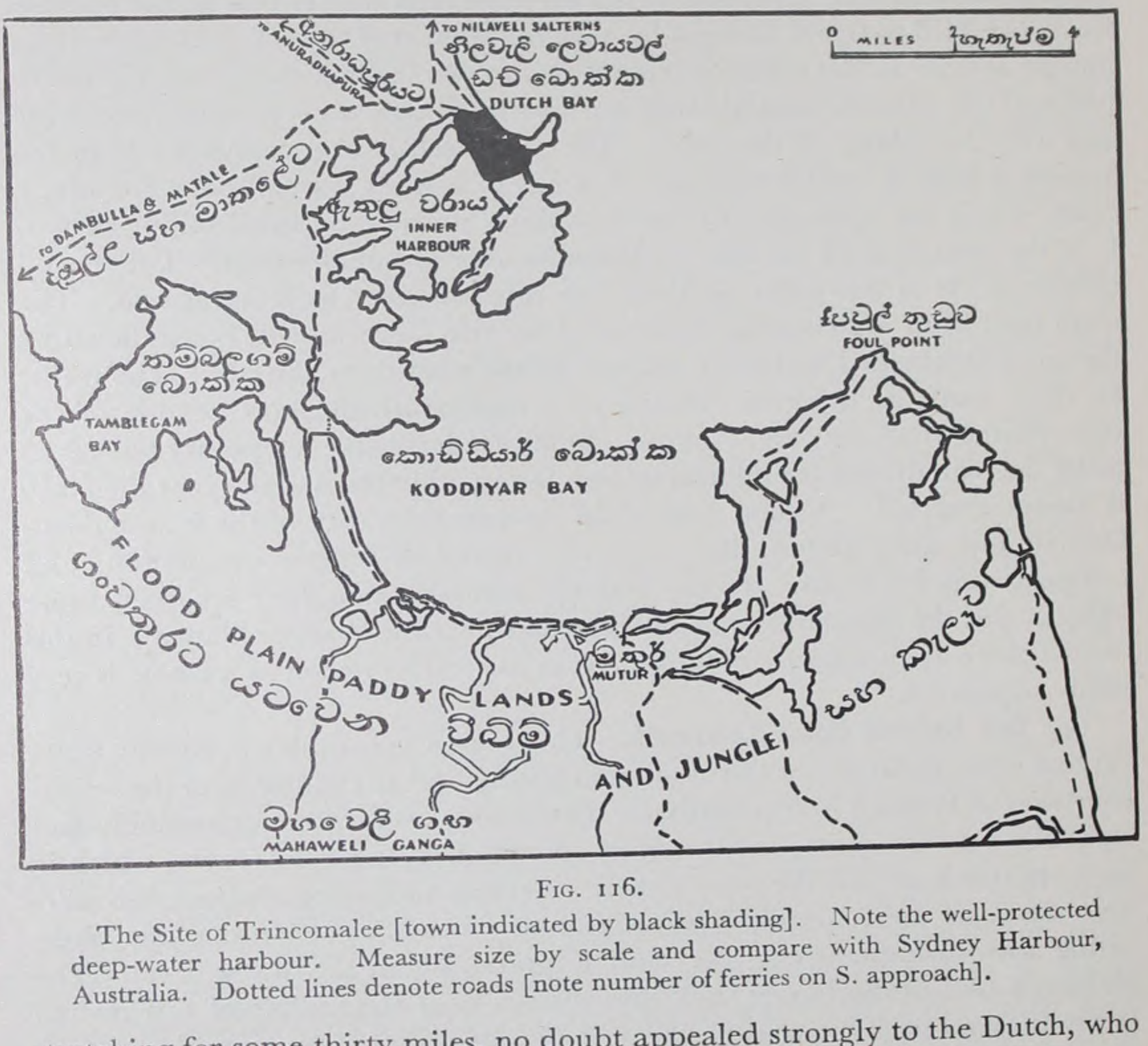

FIG. 116.

The Site of Trincomalee [town indicated by black shading]. Note the well-protected deep-water harbour. Measure size by scale and compare with Sydney Harbour, Australia. Dotted lines denote roads [note number of ferries on S. approach].

stretching for some thirty miles, no doubt appealed strongly to the Dutch, who thought of the possibility of making navigation schemes on the inland waters.

Climatically, this region is characterised by low rainfall with a single maximum during the north-east monsoon. The temperatures are relatively high, especially during the south-west monsoon, when the highest temperatures in

the island are often registered at Batticaloa or Trincomalee. The drought during the latter season is counterbalanced by the abundance of standing water brought down by the rivers which rise in the rainy hills. Rice can easily be grown, and the needs of the population are practically everywhere supplied. Mangrove swamps fringe most of the lagoons, whose waters in the olden days were swarming with crocodiles ; they are still more numerous here than in any other part of the island. Land communication along this coast is rendered difficult by the long stretches of water, where the traveller makes but slow progress as he is dependent on infrequent ferry services. After exceptionally heavy rain in the hill country extensive floods occur, which render land travelling almost impossible, especially in the neighbourhood of the mouth of the Mahaweli Ganga. On arrival at Chenkaladi, where the main road from Badulla joins the coast road near the northern end of Batticaloa Lagoon, the traveller is often confronted with a notice to the effect that the main road to Trincomalee is impassable, owing to floods. The coast is lined with an almost continuous series of small villages, which are most numerous in the neighbourhood of Batticaloa, and decrease considerably to the north of Trincomalee. Much of the communication between these people takes place by water, either on the lagoons or by sea. There are not many houses actually on the shore in a position comparable with those on the west coast between Colombo and Galle. The houses are placed well away from the sea, and many of the villages face to the lagoons and have their backs to the sea. There are long stretches of almost desolate sandy beaches. In the northern area a considerable number of temporary camps are established by the west coast fishermen, who migrate to this coast when their own seas are unsuitable for fishing during the south-west monsoon. The land is cultivated, particularly for rice and coconuts, only near the lagoons, and a large proportion of the area is covered by damp jungle which abounds in game. There are long stretches of lonely country with very few inhabitants ; the deserted tanks further inland, however, seem to suggest that the region was more populous at some period in the past. There is very little unity of life in this area. The people are scattered and cut off from one another, either by stretches of jungle, or by swamps and waterways. The majority of the people are Tamils ; the Tamil language predominates, and is even used by many of the Sinhalese villagers. Pottuvil, for instance, is inhabited by Tamil-speaking Sinhalese. Here and there are a number of very characteristic settlements of Coast Moors, such as Kattankudi, a few miles south of Batticaloa.

Trincomalee and Batticaloa bear the marks of Portuguese, Dutch, and English occupation. The Dutch perverted the Sinhalese name "Mudde Kalapuwa"

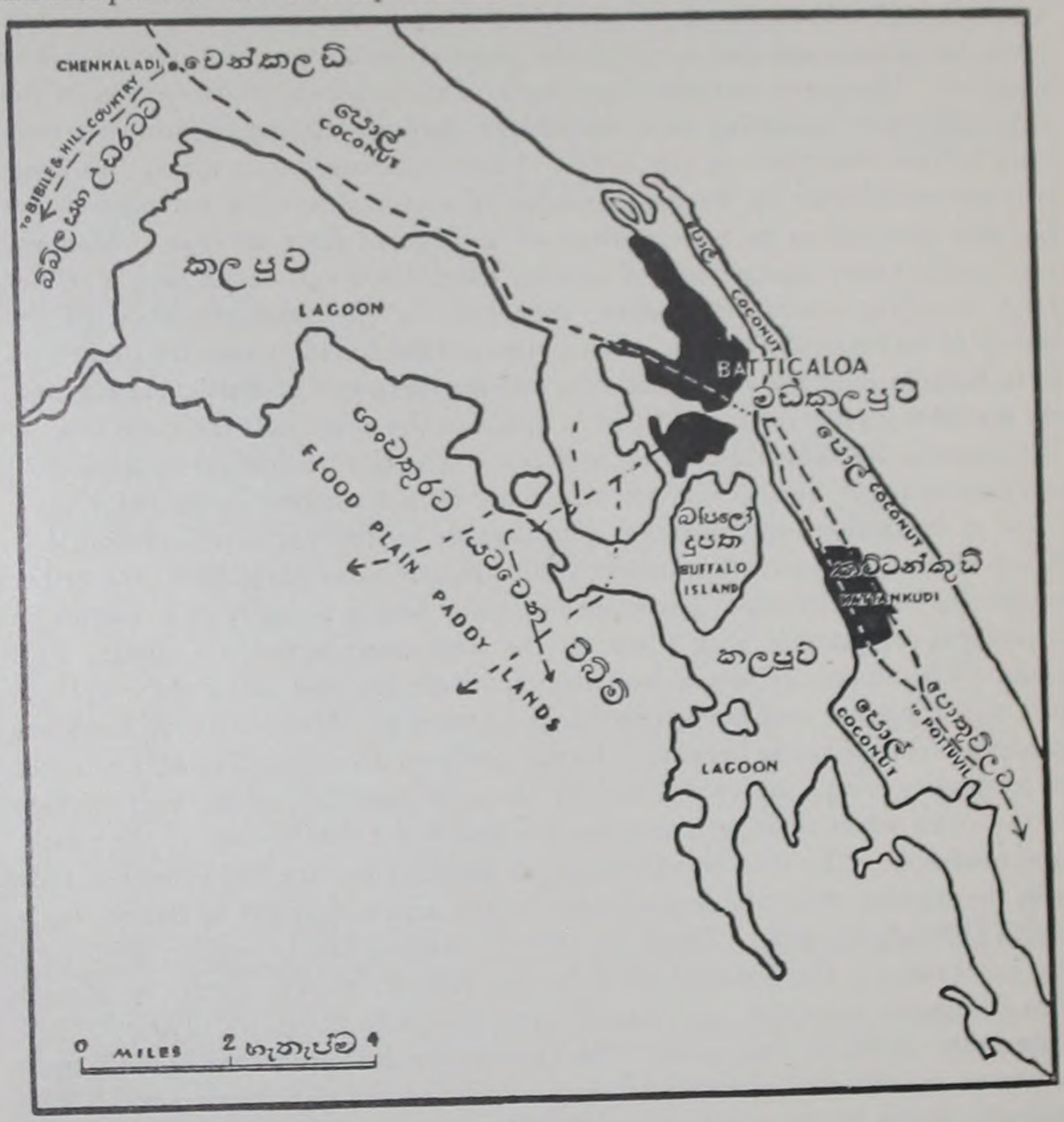

FIG. 117.

The Site of Batticaloa. Note long sand bar opposite the town. Most of the land on the seaward side of the lagoon consists of blown sand deposits.

into "Batticaloa," and left a very strong mark on this town; during their occupation cinnamon plantations, which have now disappeared, existed in the

immediate vicinity. It is also possible that as Uva was regarded as the chief granary of the Sinhalese kings, the Dutch thought that from Batticaloa they could exercise some control on that part of the island. At the present day it is cut off, like Trincomalee, from the more populous regions by vast stretches of jungle, which render both places very inaccessible by land, and have operated against their development into anything more than points of European control. The vulnerability of Singapore to attack, as proved in the Second World War, brought Trincomalee into prominence, and it has become the chief British naval base in the East. With the rapid development of its hinterland Trincomalee is likely to grow in importance both as a military base and as a commercial centre. Batticaloa is the centre of administration of the Province and can only be used as a coastal trading station owing to the shallowness of the sea there.

(5) **The Jaffna Limestone Region.** The boundary of this region is a line passing from Puttalam, roughly parallel to the coast, towards Madhu, a little to the south of Elephant Pass, and ending in the neighbourhood of Mullaittivu. The majority of the region lies within the area having a single rainfall maximum during the north-east monsoon, which stretches as far as Mannar ; the narrow strip along the coast between Mannar and Puttalam is a transition zone nearing the type with increased rainfall at the equinoxes. On account of the dryness, the temperatures are high in this region during the south-west monsoon, though not as great as those at Trincomalee and the east coastal strip generally. The region appears to be much affected by the heat focus of India during April and May, and the high temperatures are not sustained until September as in the former region. Climatically, this area would divide itself into two parts somewhere near Mannar, the southern portion having the two periods of increased rainfall and somewhat lower temperatures, though the mean annual rainfall is rather lower. Structurally, however, the region is unified by the limestone which covers the crystalline rocks. The southern edge is less distinctive as the limestone gradually thins off. From the human point of view the region is distinctly divided into two parts, consisting of the Jaffna Peninsula and the mainland area. The climatic differences are so slight and the human differences so strong, that it is perhaps more convenient to consider the two human regions separately. The Jaffna Peninsula is one of the most remarkable settlements in South Asia. The Tamil inhabitants are strongly individual in character, and the region is comparable with parts of Holland, where the people seem to be so much more important than the land itself. The Dutch, curiously enough, had a very strong influence in the Jaffna Peninsula and left behind a

number of fine buildings and fortifications. Every available space on the peninsula where the soil is not too saline is inhabited, so that there are roads and houses practically everywhere. The better land is mainly on the western side where the chief focus of life, Jaffna town, is situated. The same type of life extends into the islands, the chief of which are Velanai, Karaitivu, Mandaitivu, Punkudutivu, and Delft, and which represent a drowned portion of the peninsula. The salt lagoons, situated mainly on the eastern side, and the salt industry connected with them, are very characteristic of this region. The saline lands surrounding the lagoons are very desolate and have a peculiar scanty vegetation of great interest to students of botany, consisting of thorn shrubs and small fleshy or thorny plants of a grey-green colour. There are no plants of economic importance which can be grown on such land. The dryness of the surface and the curious underground circulation of water tend to create a series of conditions which make the Jaffna Peninsula quite distinct from the rest of Ceylon.

On the cultivated areas the chief crops are rice, tobacco, chillies, and vegetables. At one time the Palmyra was almost exclusively grown, but latterly it has to some extent been replaced by the coconut which is commercially more profitable. The Palmyra is traditionally connected with the Ceylon Tamils of Jaffna, and enters into their home life in exactly the same way as the coconut is bound up with the home life of the Sinhalese. The leaves are used for thatches and fences, which have a characteristic appearance different from those made from the coconut. The nuts form a staple food, while the timber is used in building. In the absence of anything comparable with the husk and shell of the coconut, the Palmyra is not adaptable to quite so many uses.

The mainland portion of the limestone area contains very few inhabitants. It has not quite the same distinct features as the peninsula, because the limestone is not so deep. The forest conditions which exist further south continue over the limestone, but with an increase of thorny plants and a general thinning out of the trees. In the peninsula there are no rivers of any size, while in this portion there are a large number which rise in the central uplands, and cut across the limestone in their lower courses to reach the sea, so that tanks could be made, and the conditions relating to cultivation are not far different from those obtaining further south. Giant's Tank, one of the biggest in the country, covering about eight square miles, is situated in this region, on one of the lower tributaries of the Aruvi Aru; another immense tank in a disused condition lies nearly opposite the Giant's Tank,

on the left bank of the river, and very near to the coast. The immediate neighbourhood of these tanks has always contained more people than the rest of the region, on account of its proximity to Mannar Island and its connection with the land route to India. The ancient settlement in this neighbourhood was Mantota, on the mainland, nearly opposite the modern town of Mannar. It was formerly the chief landing-place for visitors from India who wished to approach the neighbourhood of Anuradhapura and was succeeded for a time by the town of Mantai. The town of Mannar became more important during the European invasions, when it was fortified and formed a useful base of operations, because it was detached from the mainland. Mannar Island has received a great deal of foreign influence on account of its near connection with the mainland of India. The construction of a railway, opened in 1914, from Medawachchiya, about sixteen miles north of Anuradhapura, out to the coast and across by a causeway to Mannar, and Talaimannar, has considerably altered the district. Passengers and goods traffic to and from India are more and more taking this route, which is linked up to the Indian rail terminus of Danushkodi by a short railway ferry service of about twenty miles. It has caused a considerable addition to the population of the Island of Mannar. The camps connected with the pearl fisheries are usually situated along the coast between Mannar and Kudremalai Point ; this portion of the coast is nearest to the pearl banks, and the main camp is as a rule near Marichchukkaddi, which has the lowest recorded rainfall in Ceylon. The Portuguese and Dutch occupied for some time the Kalpitiya Peninsula, and its extension in Karativu Island. They fortified Kalpitiya, built a number of churches, and gave the names of Dutch Bay and Portugal Bay to these stretches of water. Life in this part of the world is mainly concerned with either fishing or the salt industry, and in a small way with trade across to India. The village life focuses on to the enclosed waterways rather than the open sea-coast, which mainly consists of long dreary stretches of sand. Coconut growing has in recent years been greatly extended on the mainland north of Puttalam, while it has been for a long time important on the sandy soil of the peninsula. The Dutch connected up Puttalam Lake with Negombo Lagoon, and created a series of waterways which enabled them to carry goods from Puttalam to Colombo by commodious barges (padda boats), without facing the risks of the open sea. Puttalam was always a centre of foreign influence. The district contained at one time a number of people called Mukkuwas, a community of Christian Tamils, who also spread along the

coast southwards towards Chilaw. They were once the chief land-owners and important traders, and are said to have degenerated greatly, owing to the influence of alcoholic drink. Very few of them now remain. There are also remnants of foreign regiments who were stationed in this district and married and settled in the island, notably a Kaffir element from South Africa. A large number of Moors inhabit the town of Puttalam ; they are either shopkeepers or engaged in work connected with the salt trade. The coastal strip behind

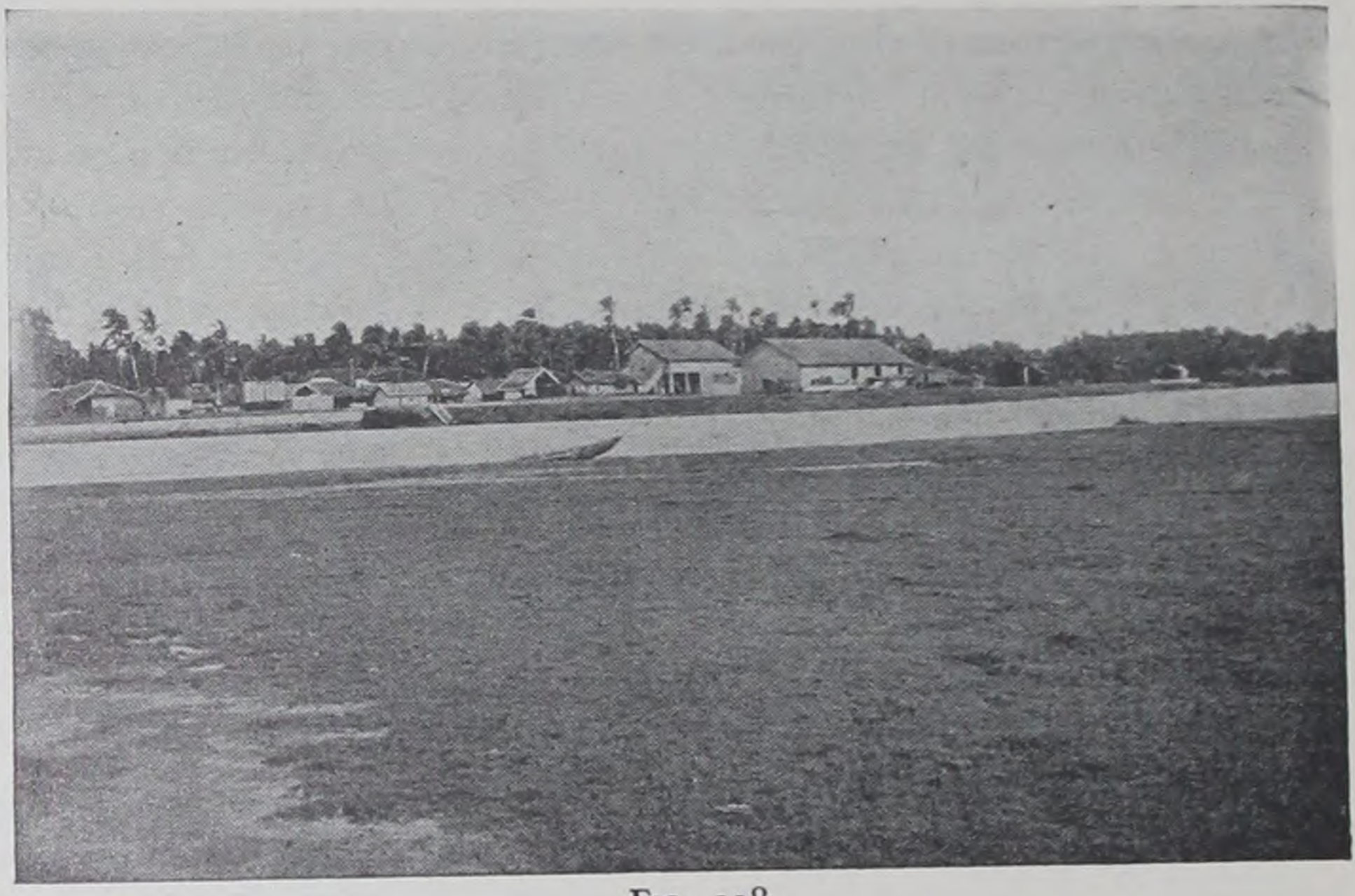

FIG. 118.

Chilaw Lagoon. Note the sand bank in foreground.

Puttalam is not at present much developed, on account of its dryness. More crops could probably be produced if more use were made of the flood waters of the rivers like the Kala Oya, which flood during the south-west monsoon. Manioc appears to be a possible crop and coconuts might be extended considerably.

(6) **The Chilaw Transition Zone.** In this region the conditions gradually alter from those obtaining in the moist lowlands to the drier conditions further north. It has been much developed in recent years, especially for coconut, which flourishes well on the blown sand extending for many miles inland. The tanks begin on its northern margin, roughly along the Deduru Oya.

Chilaw, situated on the coastal lagoon, a small fishing and trading town, is the focus of human activity.

(7) **The North Central Lowlands and Uplands.** This region stretches from Mankulam in the north to Dambulla in the south, which is roughly the beginning of the hill country. It extends on the south-east side to include a great deal of the Mahaweli Ganga valley, as far as Alutnuwara. Nearly the whole of the region is above 100 feet in height, much of it consisting of vast stretches of flat country, not greatly exceeding 100 feet, and having a number of low buried hills projecting through the sediments. In the south, as the hill country is approached, there are a number of low ridges, between 600 and 1000 feet, partially buried like the others, and which gradually rise towards the hill country. Vast stretches of this region can be seen from such view points as Sigiriya Rock, Mihintale, or the dagobas at Anuradhapura. The climate is characterised by two seasons of increased rainfall near the equinoxes, alternating with two periods when the rainfall is ineffective on account of the excessive evaporation. The rainfall is greater during the north-east monsoon than during the south-west monsoon. Irrigation is everywhere necessary, and this is the chief region in which the tanks were developed. The tank system is displayed on the sheets of the one-inch Survey Map, where every tank is marked, even though it is out of repair. Every river has a continuous series of tanks on practically all its tributaries, some of them quite small, and some from six to eight square miles in area. They are possibly the most distinctive feature of the human occupation. The maps of Ceylon most commonly in use only show the biggest tanks and give no idea of the extent of the system, of how it was planned in relation to the river valleys, and the enormous number that exist. The student is strongly advised to study some of the one-inch sheets of the Northern or North-Central Province. The abandonment of the tank country, one of the most important events in the historical geography of Ceylon, has already been explained. It rapidly became covered with dense jungle, which now stretches like a sea over hundreds of square miles. The reopening of this region has been partly due to the discovery of the marvellous ruined cities of Anuradhapura and Polonnaruwa, and partly due to the necessity of creating trunk roads to establish communication between the more populous south-west and such points as Trincomalee, Jaffna, and Mannar. It has been shown in the chapter on Human Habitations that the framework of tank villages still exists, a series of tiny settlements which have little to do with the rest of the world. The people inhabiting them were at one period called

Wanniyas, and the northern portion is often referred to as the Wanni, which simply means the " wild country." The Wanniyas were thought by the early students of the races of Ceylon to be a separate race, but it is now quite evident that they merely represent the remnants of what might be called the Tank Civilisation ; those who were able to maintain their existence after the various invasions, were cut off finally from the rest of the world by the invasion of forest over the cultivated land. Many of them became degenerate through lack of communication with the rest of the world ; they include both Tamils and Sinhalese.

The whole of this area contains no town of any size. Anuradhapura, which became the capital during the fifth century B.C., and which subsequently received many additions from the Sinhalese kings, must have been a very fine city just previous to its abandonment. After the eleventh century A.D. little is heard of it, and the whole of the surrounding neighbourhood, which had been cleared for buildings, gardens, and cultivation, appears to have been invaded by jungle. It was essentially bound up with the life of the tank civilisation, and commanded a number of routes in the north of the island. In its immediate vicinity were numerous elevated points from which the whole country round about could be surveyed, and its position was particularly related to the command of two routes, (*a*) the route of the Tamil invaders in the direction of Mannar Island, by the valley of the Aruvi Aru and its tributary the Malwatu Oya ; (*b*) the route to the retreats of the hill country via Dambulla and the Matale Valley (see route map, p. 85). During the time of the European invasions, when the life of the island had become focused into other quarters, the town seems to have been completely forgotten. It was noticed by Robert Knox, the first Englishman to remain any length of time in the island, when he escaped from capture by the Sinhalese towards the end of the seventeenth century. He was somewhat surprised to find these elaborate ruins almost completely overgrown by jungle, and apparently no inhabitants in the neighbourhood. During the last fifty years Anuradhapura has again become a living town. The population is steadily increasing, partly on account of the traffic connected with the various pilgrimages, and partly on account of the opening up of the land for cultivation. The various roads which have been constructed by the British Government all converge towards Anuradhapura, so that it has again become the chief route centre in the north of the island. The construction of the railway line through the jungle of the North Central and Northern Provinces just at the end of the nineteenth century has made consider-

able difference to this part of the island ; and the recent extension of the line from Maho to Trincomalee and Batticaloa will doubtless make a similar transformation in the eastern portion of the region. The North Central Province, which includes a great part of this natural region, was created in 1873, with Anuradhapura as its capital. The progress in the opening up of the land was very slow until the advent of the railway, and has increased rapidly since the introduction of motor buses on the main arterial roads. The most uninhabited portion is the area to the south-east of Polonnaruwa. The latter city which became capital during the eighth century A.D., after which most of the monuments were constructed, was established along an ancient route round the east of the hill country towards the Alutnuwara entrance to the hills, and finally by way of Bibile towards Kataragama ; this route fell greatly into disuse in later times, especially after the abandonment of Polonnaruwa as a capital at the end of the thirteenth century. Alutnuwara increased in importance during the same period, but was finally abandoned as this route lost its importance. The line of movement is now only represented by footpaths, which are used by some of the Hindu pilgrims to Kataragama. Polonnaruwa, with its magnificent ruins and its increasing popularity as a pilgrim centre, is developing rapidly with the restoration of the Parakrama Samudra and the inauguration of colonisation schemes, and it may not be long before it regains something like its ancient glory.

A few of the comparatively new villages at the junction of roads, such as Horowupotana, Medawachchiya, Vavuniya and Mankulam are increasing in size as trading centres, or on account of their connection with motor-bus traffic. Vavuniya has grown rapidly as an administrative centre during the last twenty-five years. The cultivation of paddy and the growing of fruit trees in the neighbourhood is making rapid headway, and it is likely that Vavuniya may soon become an important market centre as well. The whole of the tank country is, however, awaiting re-development. Experiments on suitable crops are now being made, especially in the neighbourhood of Anuradhapura. Sisal, a kind of hemp, which fetches a good price in the European market, as it is one of the best fibres for rope and string, has attained some success ; but from the point of view of lasting benefit to the island itself, the restoration of the paddy cultivation round the tanks is likely to be of much greater value than the development of cash crops. Malaria, which has hitherto been an obstacle to all forms of development, is nearing complete eradication.

(8) **The Talawa Country.** This is a very distinctive region, which on account of its inaccessibility from those areas which have been most inhabited in recent years, was formerly one of the most isolated of the settled portions of the island. It has come more into touch with the outer world since the construction of the motor road from Badulla to Batticaloa which cuts right across it. Climatically, it has the same characteristics as the tank country, but the rainfall is distinctly higher, as a rule exceeding seventy-five inches, so that it does not suffer so much from drought. In the north, east, and south, it is surrounded by a belt of almost uninhabited country. The region contains a great many hilly ridges, rising at certain points to over a thousand feet; these alternate with comparatively flat stretches containing some alluvial land suitable for paddy. There are also a few tanks. The country is drained eastwards by the tributaries of the Gal Oya, the Maha Oya, and the Maduru Oya. The most distinctive feature of the whole area is the vegetation, which includes long stretches of savanna country (grassland dotted with trees), called "talawa" in Sinhalese. The inhabitants of this region do not all use rice as their principal food. A small seeded millet, called kurakkan, is greatly in use, as well as maize, which is crushed into pieces and boiled to make a kind of porridge, which is eaten with curry instead of rice. This is at present the area containing the most Veddhas, their most important centre being at Nilgala. The rest of the inhabitants are Kandyan Sinhalese, who form a number of very interesting village communities. The inhabitants are at present comparatively poor, because they are more or less self-supporting and have not as yet developed any cash crops.

(9) **The Hill Country.** The Hill Country may in some respects be regarded as a single natural region. It is structurally comparatively uniform, and in its primeval condition it probably presented a remarkably uniform appearance, being draped with an almost continuous covering of forest. The Uva Downs and the high plains may have formed an exception to this, though their present condition, especially in the case of the Uva Downs, may possibly be the result of indiscriminate clearing of the forest. The high plains have possibly always been grassland, because of the great amount of evaporation of surface moisture, coupled with the drainage of water to lower regions. The less, however, that the forest was interrupted, the more it was likely to gain a hold upon the whole of the region. The distinctive character of the different parts of the hill country is largely due to differences in height and in the amount and season of rain. The structural regions which are outlined in the section on Relief are

perhaps the most convenient divisions of the area. They also to a great extent fit in with the rainfall regions.

(9*a*) **The South-Western Ridges** in the neighbourhood of Adam's Peak have the highest rainfall in the island, approximately 200 inches per year. This region was formerly very densely clothed with wet monsoon forest swarming with leeches. The torrential rains which are the result of the contact of the south-west monsoon with the hill walls, coupled with the moisture in the atmosphere and the hot air rising from the plains, make this district probably the most uncomfortable for human beings in the whole island. It would probably have remained uninhabited had it not been that the English discovered that it was such a good region for tea. It has no town of any size, and is mainly peopled by a number of English planters on large estates who employ immigrant Tamil labourers. Running water occurs everywhere, and there are many magnificent falls. It is in this region where hydro-electric schemes could most easily be developed, especially on account of its proximity to the densely-peopled Western Province. Routes focus inwards towards the village of Maskeliya, the tea estates being mainly on the leeward side of the hills. The two chief rivers of the island, the Mahaweli Ganga and the Kelani Ganga, take their rise in this region. The shrine on Adam's Peak brings a large number of pilgrims into the district during the middle part of the north-east monsoon, when the area is comparatively dry. The moist atmosphere causes a great deal of inconvenience. It is difficult to keep clothes and household articles, books, etc., because they so easily perish owing to the attack of fungus growths. Sometimes for many days it is impossible to dry clothes which have been washed, because the atmosphere is so saturated with moisture. There is, however, compensation for the inhabitants in the fact that this region contains some of the grandest scenery in the island, and the cloud effects at sunrise and sunset are often magnificent.

(9*b*) **The Hatton Plateau** is a distinctly drier region, though its rainfall is in the neighbourhood of 150 inches. A certain amount of rain shadow is created by the high ridges which shield it from the full effects of the south-west monsoon. It has three periods of increased rainfall, one at each equinox and one in the middle of the monsoon season. It has a more pleasant climate than the Adam's Peak Ridges, though the moisture causes a certain amount of discomfort. The temperature is usually in the neighbourhood of 70° F. and in the driest part of the year, November to February, the climate is exceedingly pleasant, and Hatton, its natural centre, is greatly used at that season by people wishing for a change from the low country. The area is rapidly becoming one vast and

continuous tea garden; hill after hill has been completely cleared and is planted out with neat rows of tea bushes. The principal inhabitants are English tea planters and their Tamil labourers.

(9*c*) **The High Plains.** The High Plains form the greatest continuous area of elevated land in the island, large portions of the plateau being in the neighbourhood of 7000 feet. Though the temperature is usually near 60° F., and the rainfall between 75 and 100 inches, the heat is felt more than at Nuwara Eliya, on account of the absence of trees. The region has never been much inhabited, though the climate is healthy and bracing. In latter years it has mainly been used as a camping ground for troops in training or for soldiers or sailors invalided from other unhealthy parts of Asia. The chief centre is Diyatalawa, on the edge of the region.

(9*d*) **The Uva Basin.** The Uva Basin forms a very distinctive natural region. Its rainfall is as low as fifty inches, owing to the rain shadow created by the surrounding high ridges. It suffers considerably from drought during the middle of the south-west monsoon season. The dryness of the atmosphere in this part of Ceylon, coupled with its elevation, make it one of the healthiest parts of the island. Bandarawela has become a health resort for consumptives. The air is distinctly bracing, and forms a welcome change to people who are enervated by the moisture of the south-western lowlands. The grass-covered Uva Downs have already been described. There is a good deal of old paddy cultivation along the valley floors, but in recent years tea has gradually invaded the hill slopes, in spite of the dryness, and the area under this crop is gradually increasing. It is possibly the driest region in the world under cultivation for tea. Badulla the chief town of the Uva Basin, occupies a site of some antiquity (see Fig. 119), and had a long connection with the Sinhalese kings because they used the neighbouring country as a granary. Small villages such as Demodera and Welimada have been rapidly developing during recent years, as the tea plantations have increased. The English population is also increasing, but Sinhalese are decidedly in the majority.

(9*e*) **The Lunugala Region.** The ridge which culminates in the Peak of Dorepotagala (4969 feet), is severed from the main mass of the hill country by the valley of a small tributary of the Mahaweli Ganga. It is a long, wall-like ridge, parallel to the outer wall of the Uva Basin. The greater part of it is covered with forest, but a good deal has been cleared for either rubber or tea, the clearings being comparatively new. The opening up of this region, together with the eastern platform which lies around it, and which for con-

venience will be classed with it, is now proceeding quite rapidly. From the gap at Passara the main road from the Uva Basin descends on to the lower platform,

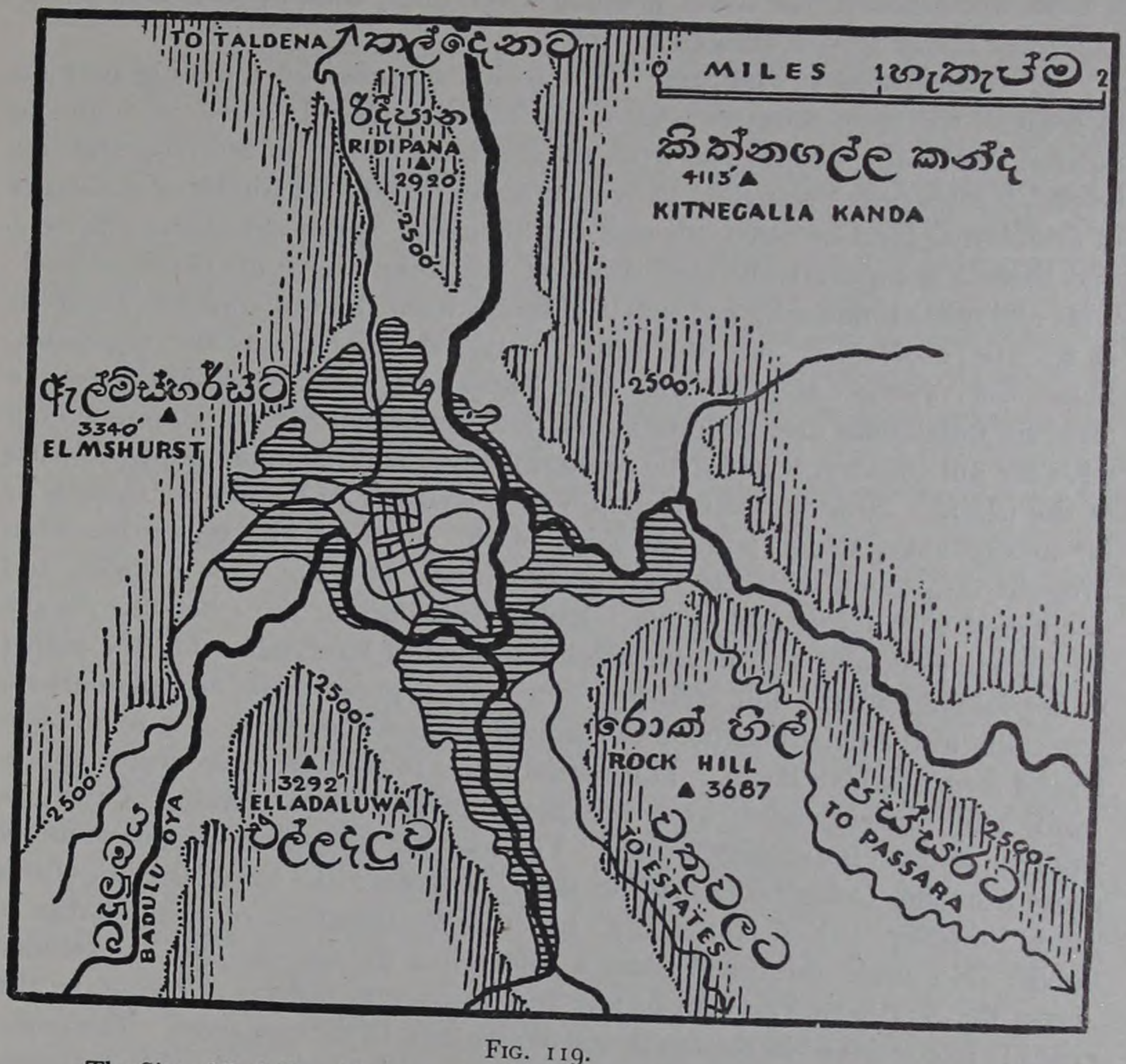

FIG. 119.

The Site of Badulla. The town is in the centre of the map, in a large bend of the river, and is surrounded by paddy lands (horizontal ruling). Four valley routes meet at Badulla.

and divides into two branches, one of which takes the inner flank of the ridge, past the village of Madulsima. The other, passing along the eastern front to Lunugala, descends to Bibile and forms the main road to Batticaloa.

The whole region is somewhat scantily populated, a few small villages being along the two roads and dotted about on the south-eastern platform. Rubber is most developed in the lower portion of the area, while a good deal of the Lunugala Ridge is high enough for tea.

(9*f*) **The Southern Platform.** This region occupies an imposing position in front of the steep southern wall of the hill country. It is like an immense natural step, with a rapid rise from the flat low country to the thousand-foot level. It rises near Balangoda to over 3000 feet, but the remainder of it consists of undulating land between one and two thousand feet in elevation, with here and there a comparatively high rounded hill rising above the platform level. This region is climatically not much different from the low country, though it is a little cooler. It has the same increased rainfall at the equinoxes. Before the construction of the road from Ratnapura, which cuts right across the area via Balangoda and Haldummulla, and connects it by the Haputale Gap with the hill country, it had little communication with the more populous parts of the island. Now that the Kelani Valley Railway to Ratnapura extends as far as Opanake, which is at the edge of the platform, the region has been brought into touch with the Western Province. It is not very malarial, and is covered with forest and chena. Rubber plantations are extending on the Balangoda side, and also in the neighbourhood of Koslanda. On the higher slopes leading to the hill country, there are a great many tea plantations, especially in the neighbourhood of Haputale, where they have, as it were, overflowed from the Uva Basin. This region seems to offer very favourable opportunities for development, as it has many of the characteristics of the low country, and yet is distinctly cooler. The road across it offers the easiest motor route from the Colombo District to the Uva Basin ; the lower portion of this road, however, below Ratnapura, has the disadvantage of being liable to floods. No doubt there will come a time when the railway will be extended across the Southern Platform to join the up-country railway at Haputale, and possibly to continue via Koslanda and Wellawaya to the east coast. The population is at present very sparse in this area, and consists of a few scattered villages and planters' bungalows. Koslanda is the most important business centre on account of its relation to the neighbouring tea plantations.

(9*g*) **The Piduru Ridges.** This region consists of a central elevated area containing a number of the highest peaks in the island, from which radiate in all directions a number of ridges, alternating with deep valleys. Pidurutalagala (8292 feet), though the highest point in Ceylon, is not by any means the most

imposing peak. It is merely one of a number of rounded knobs which protrude from the most elevated portion, and which rise from valleys already at 6000 feet. It therefore does not look as high as Adam's Peak, which rises much more abruptly from the lower valley. The well-known Hakgala Rock, with its precipitous crag of 1600 feet, approached by a narrow gorge, is a much more striking feature. The most important of these ridges are as follow : the Great Western Ridge, whose highest point is 7264 feet, due west of Nuwara Eliya ; the Talankanda Ridge, whose highest point is 6137 feet, which strikes out to the south-west in the direction of Hatton ; the ridge extending southwards, cutting into the High Plains, and ending in the three peaks of Totapola (7741 feet), Kuduhugala (7610 feet) and Kirigalpotta (7857 feet) ; the two ridges north and south of the Uda Pussellawa Valley, with somewhat lower peaks ; a lower but longer ridge extending northwards in the direction of Kandy. Between the latter and the Great Western Range is the remarkable Ramboda Pass, one of the chief passage ways through this complicated region in which communication is so extremely difficult. The lines of movement are along comparatively narrow valleys, all of which are remarkably beautiful. The four chief routes are arranged diagonally from Nuwara Eliya. The Nanu Oya Valley is the entrance from the Hatton Plateau ; another route in the direction of Hakgala leads to Welimada in the Uva Basin ; the third, in which the railway is continued, leads to the Uva Basin by a north-easterly route via Uda Pussellawa ; the fourth is the Ramboda Pass, leading to Pussellawa and Gampola. Climatically, this region is noteworthy because it is the coolest part of the island. It is the only part that is ever at all cold, and often has conditions somewhat comparable to those of the Temperate Zone, though only 7° from the Equator. Its cool climate makes it similar to the highlands of Kenya in Africa, or of Ecuador in South America. The rainfall is between 75 inches and 100 inches, and increases westwards. As far as seasons of increased rainfall are concerned, it is transitional ; the more sheltered places have two maxima, while a number of stations on the west side, especially on the south-westward slopes, show a considerable increase during the south-west monsoon season. The higher mountains have a distinctive type of forest, which is described by H. W. Cave in the following extract.

Speaking more particularly of the Piduru forests, he says : " We see weird trees with gnarled trunks and forked boughs, festooned with long beards of lichen and orange moss. Many of the trunks are clothed with rich green creepers and adorned with the fantastic blooms of native orchids, and parasites

innumerable bedeck the upper branches with strangest flowers, while the magnificent *Rhododendron arboreum*, with its great branches and brilliant blossoms, appears everywhere as a common forest tree."

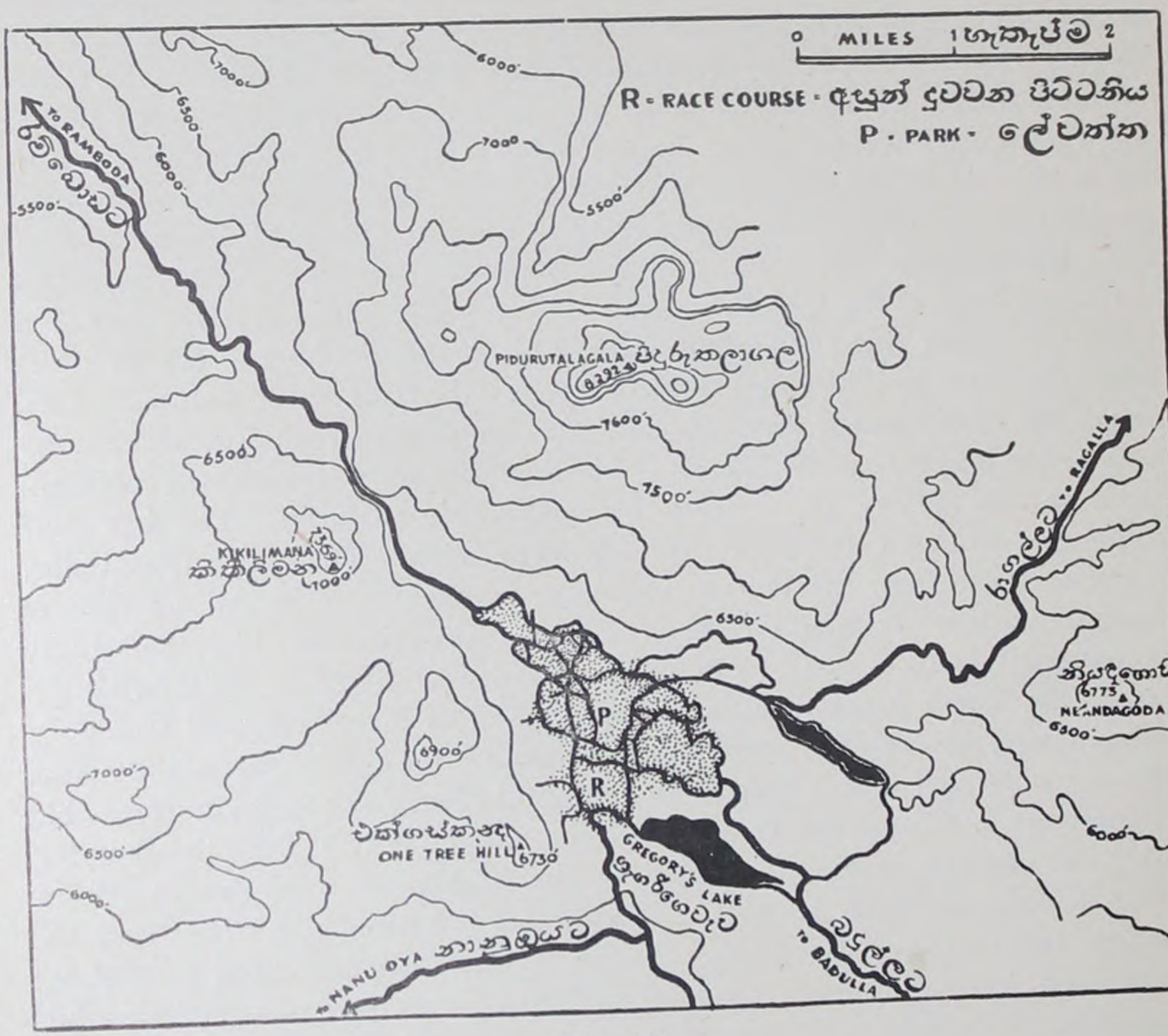

FIG. 120.

Site of Nuwara Eliya. Dotted area shows extent of town. Black block shading = lakes. Thick black lines = roads.

The elk, or Sambhur, which is indigenous to Ceylon, is hunted in these forests. In former times this region was but little inhabited because of its inaccessibility. There were a few small villages around the paddy lands on the alluvial valley floors ; and it was used as a retreat during times of war. During

the English occupation, however, the whole region has become completely transformed. The English suffer greatly from debility by continued residence in a hot, wet climate ; this was much more severe during the early occupation than it is at present, because they had then not learnt how to protect themselves from various tropical diseases. In 1827 some adventurous English officers who were wandering about the island elephant hunting, discovered the beautiful mountain basin by the side of Pidurutalagala in which the town of Nuwara Eliya now stands. Being struck by the beauty of the place, they reported to the Governor, Sir Edward Barnes, that it had a remarkably cool climate and might be useful to the English if it were made accessible. The Governor at once had a road made to this spot, and had some houses erected, with the idea of using the place as a sanatorium for himself and the various civil servants and soldiers who were suffering from tropical lassitude. As time went on, the place became very popular as a holiday resort, and is now greatly used by the more wealthy Ceylonese. Tea estates rapidly increased in this district, though at the present moment a great deal of it is still in its original wild condition. The construction of the up-country railway, and especially its extension to Haputale, after 1889 made a tremendous difference to this neighbourhood ; the construction of roads went on apace, roads which rank among the most remarkable in the world. The advent of the motor-car made the railway less important for passenger traffic. It is now used mainly for goods, and carries enormous quantities of tea down to the coast, as well as bringing food stores and other necessities to the inhabitants. The creation of the roads and tea plantations has caused the development of a number of new villages, many of which are inhabited by Indian Tamils. Nanu Oya is now a busy centre, as it is a railway junction for the Uda Pussellawa line. The railways constituted a great engineering feat; their construction necessitated very difficult work in cutting out or boring through the hard crystalline rock, where there seemed to be no possibility of making a road, much less a railway line. The Ramboda Pass is lined with villages, which are kept in communication with the rest of the world by frequent motor-bus services. As on the Hatton Plateau, this area, which had few original Sinhalese inhabitants, is mainly populated by English planters and immigrant labourers. At Blackpool, on the road to Nanu Oya, the falls of the Nanu Oya are used for generating electricity to supply Nuwara Eliya and many of the estates. Improvements continue in the town of Nuwara Eliya, which is still enlarging. The site has been improved by the construction of two artificial lakes which were created by the damming of streams. The

English take a great interest in the agriculture of this part of the island because it is possible to grow a good many of the fruits and vegetables which belong to the Temperate Zone. To the Ceylonese the experiments made here by the English are important, because they have increased the range of possible crops. Hakgala Gardens have been established for the purpose of experimental work on Temperate Zone crops. Most of the fruits and vegetables of England, except the strawberry, can be grown in this region, though they are not always as good in quality. The potato, for instance, is never at its best in Ceylon.

(9*h*) **The Kandy Plateau.** This region has for a long time been the most populous and well-developed portion of the hill country. Its development has depended not so much upon its superior resources as upon its accessibility (*a*) from the Northern Lowlands via the Matale Valley, and (*b*) via the Kadugannawa Pass and the Ginigathena Gap from the Colombo District, the great focus of trade since the European conquest. The establishment of Kandy as the hill capital at the end of the sixteenth century, was undoubtedly due to its command of routes, and the construction of the Dalada Maligawa (Temple of the Tooth) and later, the institution of the Perahera procession, towards the end of the eighteenth century, created associations of national tradition which made it something more to the Sinhalese than a mere fortified centre. The beautiful lake, which is now regarded as an inseparable part of the town, had nothing to do with the determination of its site; it is an artificial creation made by the last king of Kandy, about the year 1810. The paddy fields occupying the floor of the valley, which were sacrified to make the lake, had probably much to do with the determination of the site, which at the time of its foundation was referred to as " a place surrounded by marshes and hills." The legend associated with the foundation of Kandy (quoted by L. J. B. Turner in *The Ceylon Antiquary*, Vol. IV. part II.) is somewhat significant. It is said to have been founded, long before it became the capital, by Vikrama Bahu III. towards the latter end of the fourteenth century, when he had his capital at Gampola. On consulting one of his old and learned men for a lucky spot in which to found a town, the site of the Tooth Temple was indicated, because on that spot the sage had seen a squirrel victorious over a rattlesnake. This is perhaps symbolic of the history of Kandy, which was for three hundred years the scene of incessant conflicts against European intruders, and which has now become one of the most peaceful and beautiful cities in the world. The site bears some similarity to that of the town of Lucerne in Switzerland, which

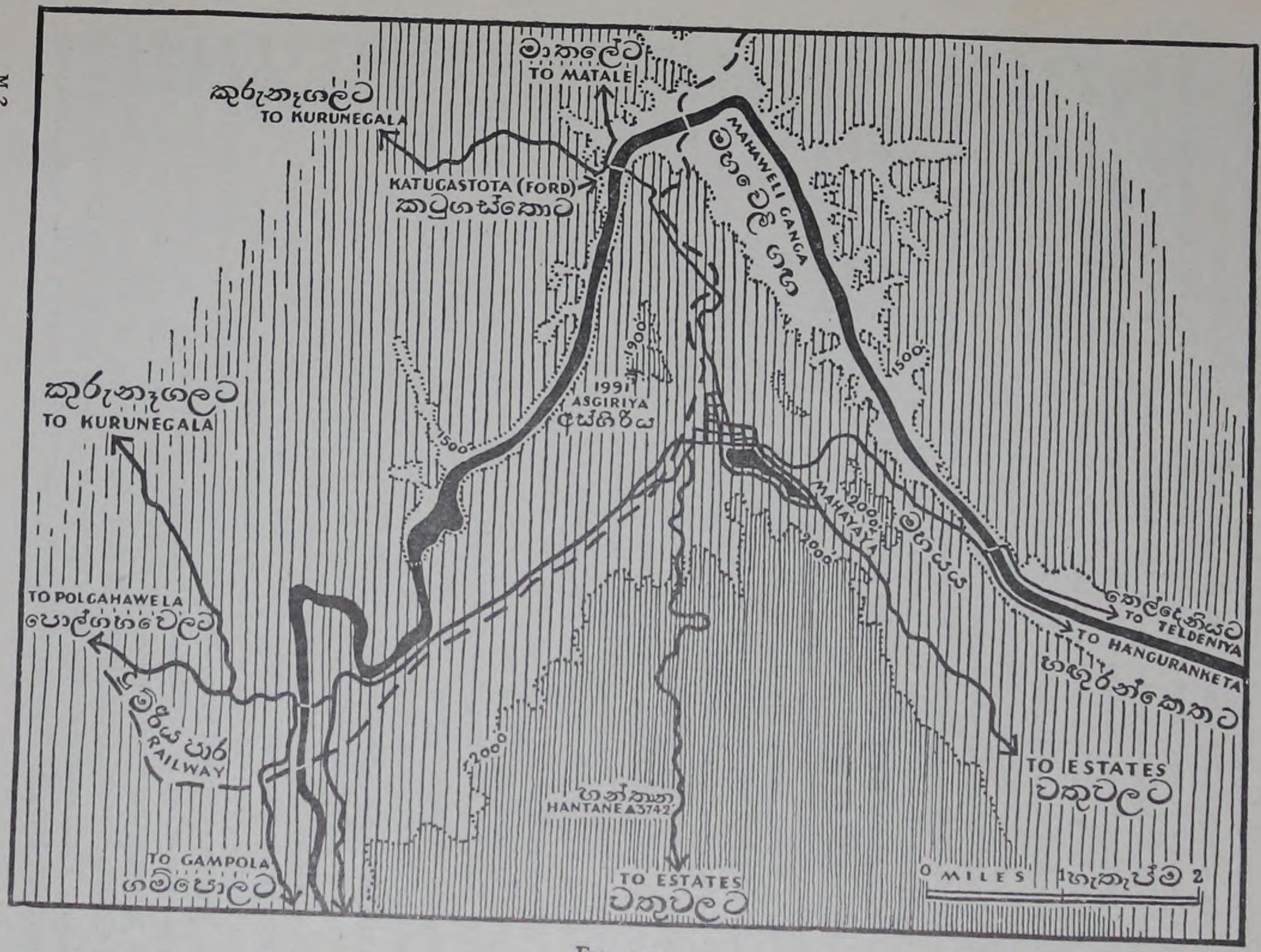

FIG. 121.

The Site of Kandy, at meeting of roads in centre of map. Kandy Lake in black block shading. Note bend of Mahaweli Ganga, narrow valley of river, and high hills (good view-points) near town. Kandy = Maha Nuwara (the Great City) in Sinhalese.

stands on a much bigger natural lake but which was also the scene for so many years of the struggle for liberty on the part of the Swiss nation.

The town of Kandy has never been known to the English by its Sinhalese name, which is Maha Nuwara, or the Great City. The origin of the name Kandy is probably connected with the Sinhalese " Kande," meaning a " hill." When the British soldiers inquired the whereabouts of the Sinhalese army, they were no doubt frequently given the answer, " Kande," meaning that they were in the hills, and from this came the perverted form, " Kandy." The modern town is the greatest business centre in the Hill Country, and has a stream of people coming and going all the year through. A large number of tourists come up from the boats in the harbour for short periods, and it is a holiday resort for wealthy Australians who visit Ceylon and stay for long periods in the big hotels, both at Kandy and Nuwara Eliya. Kandy is annually visited by thousands of pilgrims in August, during the time of the Perahera, while when the Tooth Relic, which is shown at irregular intervals, is on view, enormous numbers of pilgrims crowd into the town and require temporary accommodation. Kandy is therefore well supplied with lodging-houses of every description, and many more shops than the number of permanent inhabitants would warrant. During the pilgrim seasons a large number of temporary stalls for selling food and other necessaries are set up in the streets. Both at Kandy and Anuradhapura the regulation of the pilgrim traffic is a very important problem of local government. Kandy is the centre for a number of societies organised for the purpose of assisting pilgrims.

The Kandy Plateau has a rainfall comparable with that of the Hatton region, the average annual amount being about 75 to 100 inches. It only falls below the seventy-five inch average in the small hollow in the neighbourhood of Malipitiya on the eastern side, on the extreme border of the region. The temperature is slightly higher than that of the Hatton Plateau, being as a rule in the neighbourhood of 75° F.; it is distinctly cooler than the Low Country, the average elevation being about 1500 feet. Very little of the natural forest is left in this region, apart from what is on uncultivable mountain slopes. There are many patches of open grassland representing the abandoned coffee plantations, which were most numerous in this area. At present tea is the predominant crop, though there is a considerable quantity of rubber produced in the Mahaweli Ganga Valley, near Gampola and Wattegama, as well as in the Dumbara Valley. The latter is a very outstanding feature of the Kandy District—a wide open valley lying to the east of Kandy, separated from it by hill ridges, and con-

taining a great deal of fertile land, on which cocoa and tobacco are successfully cultivated. The alluvial valley floors are used for paddy, and this region contains some of the finest paddy terraces in the Hill Country. The population, which was no doubt at one time more dispersed, has been attracted more and more to the main arteries of communication. There are small villages dotted about all over the area, and a large number of isolated planters' bungalows along the hill slopes ; but the most important villages lie along the main roads which lead out from Kandy in all directions. Teldeniya and Wattegama are the chief centres on the east. Katugastota (tota = ford) is situated in a very important strategic position ; the road from Kandy northwards to Matale, which played such a great part in Sinhalese history, here crossed the Mahaweli Ganga, which was fordable, at any rate by elephants, at this point. It is at present quite a small town. Peradeniya has assumed importance since the English occupation, partly on account of its world-famed botanical gardens, to which a school of agriculture is now attached. It has been chosen as the permanent University town, and the construction of the University buildings in the University park is making rapid progress. It is hoped to establish the University of Ceylon at Peradeniya within the next few years. It is situated in a very beautiful position, just above a point where the Mahaweli Ganga makes its way through a narrow rock passage of remarkable beauty ; it is also conveniently placed on the road from the Kadugannawa Pass to Kandy. The railway which enters by this Pass was brought up to Kandy in 1867. The road parallel to the railway is one of the most famous roads in history. The British acquired from the Romans a certain skill as road-makers ; they have carried this with them to all their colonies, and developed a settled policy of using good roads as an aid to government. The early British governors were convinced that unity in Ceylon could only be attained by making a series of good arterial roads into the Hill Country, otherwise the latter would remain completely isolated. After ten years work of the most arduous nature, including cuts in the solid rock, tunnels, and bridges over precipices, the road was finally completed in 1831.

Gampola is the chief town on the west side of the Kandy District. It occupies a very important strategic position, superior in some ways to Kandy. On a clear day almost the whole of the south-western lowlands can be seen from a hill immediately behind the town, while it stands midway between the Kadugannawa and Ginigathena Passes, as well as commanding the entrance to the Ramboda Pass. It only remained the capital for about thirty years during

the fourteenth century, though it was greatly used as a retreat during the later campaigns. At present it is mainly important as a goods depot on the railway, serving the neighbouring planting districts, and as a centre for many motor-bus services. It has a very ancient temple, the Wallahagoda Dewale, and a religious

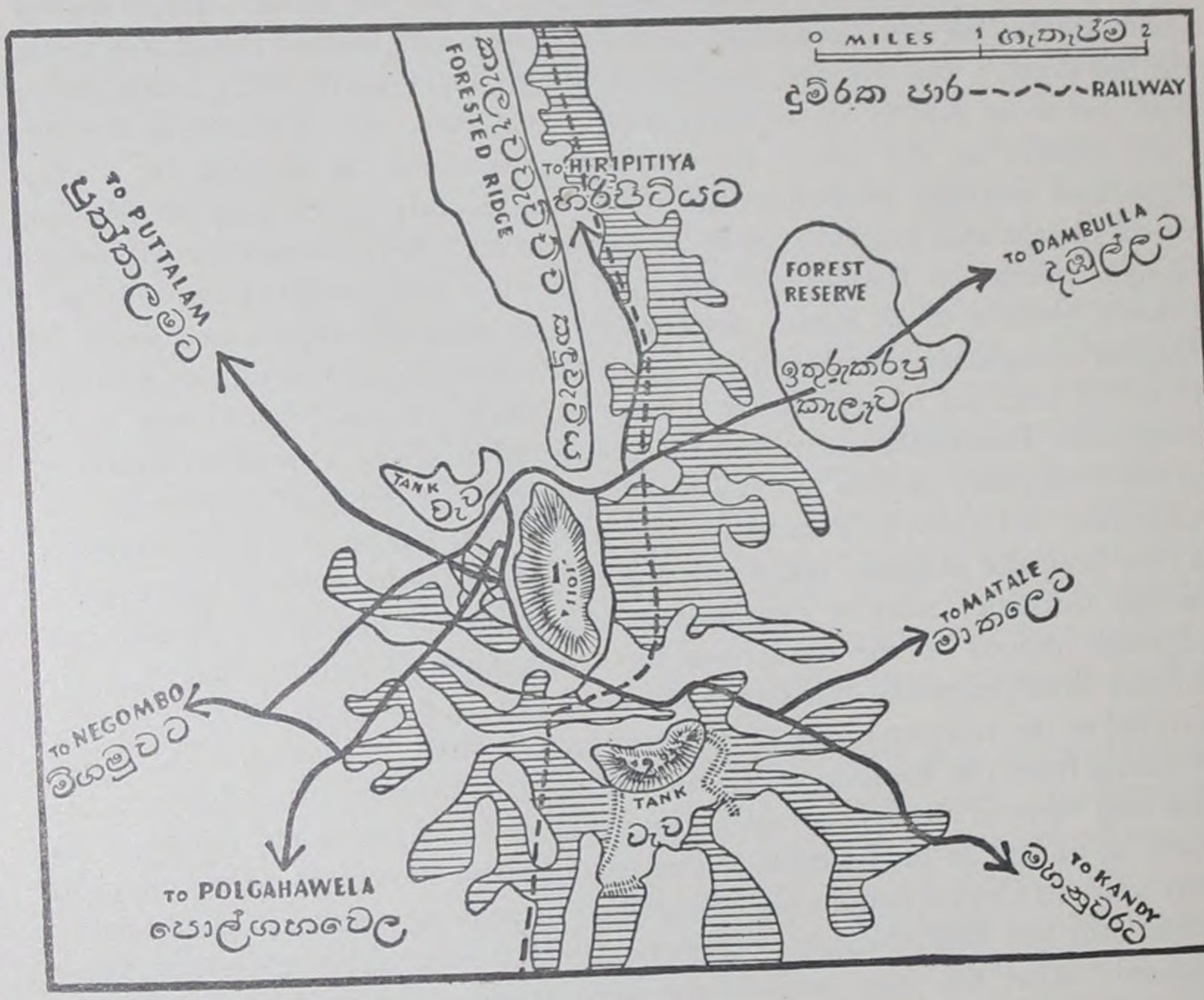

FIG. 122.

The Site of Kurunegala. Hill 1 is Elephant Rock, beside which the town is placed. Hill 2=Kolepalella. Note extensive paddy lands (horizontal ruling) and roads radiating in all directions.

procession older than the Perahera, which has been held annually for over 800 years. The ancient name of Gampola is "Gangasiripura." Further up the Mahaweli Ganga Valley is Nawalapitiya, which stands at the entrance to the Hatton Plateau at a point where the Dolosbage group approaches nearest to

the Mahaweli Ganga. This town also is a route centre, though much newer than Gampola. It commands the main road up and down the Mahaweli Ganga Valley, a branch of which drops down to the Low Country by Ginigathena to Yatiyantota, a ford town on the Kelani Ganga, as well as two important roads leading to planting districts in the Dolosbage group and the Hatton Plateau. Both Gampola and Nawalapitiya contain a large number of Moorish traders.

(9*i*) **The Dolosbage Group.** This block of hills is cut off from the main mass by the Mahaweli Ganga Valley. It has a considerable area over 3000 feet, the highest point, Unulugala, reaching 4404 feet. It has a high rainfall, is densely forested, and contains a good deal of fine rock scenery, including the famous " Bible Rock." The roads approach it from the edges, there being only footpaths that completely cross the region. It is now being opened up for planting, particularly for rubber. There are some fine paddy terraces on the valley floors, with accompanying small villages, but the whole region is very scantily populated.

(9*j*) **The North-Western Uplands.** This is a transitional area which is difficult to classify. It is outside the Hill Country proper, yet it contains considerable areas of high elevation where the conditions are very like the Hill Country, alternating with wide valleys which partake of the characteristics of the Western Low Country. The area has been greatly developed for plantations, rubber being more important in the south, where the chief centre is Kegalla, and coconuts in the centre, especially in the neighbourhood of Polgahawela and Rambukkana. Passing further north, we reach Kurunegala, an old strategic position of some importance, which was used by the Sinhalese kings as a capital for some time during the early part of the fourteenth century. The famous Elephant Rock no doubt formed a magnificent natural hill fortress, from which the countryside for miles around could be seen. Five important roads radiate out from the modern town—to Puttalam, Negombo, Colombo, Kandy, and Dambulla. In recent years it has renewed its importance and become a planting centre ; a large area in the neighbourhood has been cleared for cultivation, much of which is occupied by white planters. There is a strong English influence in Kurunegala. Coconut is the chief crop, while cocoa is being developed in the somewhat stuffy valleys to the south-east of the town. It is also important as a centre for graphite mining ; there were formerly a large number of mines in the immediate neighbourhood, but now there are only a few being worked to the east of the town on the hills approaching the Matale District. The town has been growing very rapidly in recent years.

(9*k*) **The Matale Valley.** This is a very distinctive region, partly on account of its shut-in nature, and partly owing to its long connection with Sinhalese history. To the east and west the valley is flanked by long ridges, over 3000 feet in height ; to the south, it gradually rises to a wall of small hills through which a narrow and winding road leads up to the Kandy Plateau ; to the north, the valley gradually lowers, and merges into the uplands of the North Central Province. It is drained by a series of streams which form the upper portion of the Amban Ganga, the biggest tributary of the Mahaweli Ganga. The waters of these streams supply a large series of paddy terraces along the floor of the valley. There is in the valley a good deal of crystalline limestone, which is poor in surface water. Much of it is quarried to burn for lime, and some is under cultivation, usually under coconuts, because they can live in the very poorest soil provided the atmosphere is hot and moist. The rainfall is between 75 and 100 inches, though it exceeds 100 inches in the neighbouring hills, from which a good deal of water drains into the valley. The chief characteristic of the climate of the Matale Valley is its stuffy atmosphere. It is always very moist, and as it is shut in by hills on all sides it is well protected from the wind. This makes it admirable for the cultivation of the cocoa plant, which is gradually extending. Tea and rubber are, however, the chief crops. Most of the valley slopes are cultivated, the farmers including both Sinhalese and Tamils ; there are, however, an increasing number of English planters settling in the district. A series of small villages are along the valley floor, as well as in the tributary valleys. The road which leads from Kandy through Katugastota down the Matale Valley to Dambulla (the oldest rock temple, constructed in the first century B.C.), from which it diverges northeastwards to Sigiriya (a magnificent rock fortress built as a retreat during the fifth century A.D., by the parricide King Kasyapa), and north-westwards to Anuradhapura, is one of the most important routes in Sinhalese history. It was the easiest way into the Hill Country, to the retreats on the Kandy Plateau beyond the Mahaweli Ganga, from the populous northern lowlands. The town of Matale is one of the oldest trading centres along this route. It contains a large proportion of both Tamils and Moors, who are mainly shopkeepers. This town, like Kandy, was comparatively early settled by missionaries of various Christian sects, contains a large number of schools, and has been the centre of very vigorous Christian missionary propaganda. The district abounds in places with historical associations, the most interesting of all these being the Aluwihare. From the topmost rock of this temple a splendid view of the

whole valley is visible on a clear day. At the present time the Matale region suffers a little from the economic point of view, because it is rather cut off from the rest of the world. Instead of leading to the prosperous tank country of ancient days, it now opens on the north to vast stretches of undeveloped jungle with a very small population, while on the east and west it is cut off by hills whose summits are covered with jungle through which very few roads have been cut. The town of Matale has remained a typical " street " town with its long line of shops along the main road, and is still the chief business centre of the district. The railway from Kandy has brought it much more into touch with the rest of the world.

(9*l*) **The Knuckles Group.** This section of the Hill Country is cut off from the main mass, on the south by the Mahaweli Ganga Valley and on the west by the Matale Valley, the connecting link being the ridge which extends across the upper Matale Valley towards Wattegama. The central and eastern side of this region is wild country with no roads capable of taking anything more than a small bullock cart, and almost uninhabited. The few people who live here are mainly chena cultivators. In olden days it was no doubt more inhabited, on account of its connection with the route from Dambulla to Alutnuwara, the chief entrance to this side of the Hill Country, now completely abandoned. An interesting feature of this region is Nitre Cave, a large natural cavern inhabited by thousands of bats, whose droppings have created a deposit on the floor of the cave. The western side of the region is considerably developed, mainly no doubt on account of its greater accessibility from the Kandy Plateau. It is possible, however, that the heavy rain on the north-eastern side of the mountains drives the people to the drier side. This is the region most notably affected by the north-east monsoon. The rainfall exceeds 100 inches, and in the highest part of the group approaches 200 inches. At St. Martin's Rangala the annual rainfall averages 180 inches, but this is on the more sheltered side of the range ; there are, no doubt, a number of points on the more exposed sides of the hills where this figure is exceeded. The rainfall is comparatively low during the south-west monsoon season, shows a marked increase at the equinoxes, and reaches its maximum during the north-east monsoon. The temperatures are somewhat similar to those on the Kandy Plateau. The chief ridge, which is completely forested, exceeds 5000 feet, the highest point, called the Knuckles Peak, being 6112 feet. The western side is now considerably developed for tea cultivation, while a little rubber is produced round about Madugoda, in the south-east. Three motor roads have been

duced round about Madugoda, in the south-east. Three motor roads have been developed far into the region, one from Wattegama into the north-western section, and two from Teldeniya, which lead to the central heights near Rangala and to the southern area near Madugoda respectively; the latter continues to Alutnuwara and is the only road that completely crosses the region. The estates in this area are mainly developed by English planters, and are steadily increasing. The region has no natural town centre; the life focusses down on to the Kandy Plateau towards Wattegama and Teldeniya, and finally to Kandy, which is the chief centre for its social life. No railway enters this region, the motor-car being the chief means of transport.

PART V. CHAPTER 2

CONCLUSION

Modern geography is essentially practical. The study of your own country ought to help you to be a good citizen. Now that you have come to the end of this book go back over it and think out :—

(*a*) How much of your country is undeveloped and why it is so.
(*b*) What steps can be taken to improve existing conditions.
(*c*) What you can do to help.

Do not let your study end when you close this book. Make it your aim in future life to know your own country, and especially the neighbourhood in which you live. There is much more to be done, and these few pages form but a brief introduction to a subject of infinite scope and interest. Ceylon has often been called by casual visitors an " earthly paradise." We who know it well, know that there are many blots on the landscape. All countries, however, have their dark spots, and it is your duty to help to remove them. This study should, at any rate, convince you that your own country is a land of great possibilities.

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